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Sierra on-line in Texas

By James Connolly
CW Staff

BELLAIRE, Texas — A 10% faster response time, speedier repairs and savings on space, air-conditioning and power use: These are among the expected benefits when one of the first IBM 3090 mainframes goes into full commercial operation at a data processing center here tomorrow.

The installation of the 3090 Model 200 processor at Texaco, Inc.'s DP center was completed in just seven hours on Aug. 25. Following a week of diagnostic work and operator training, Texaco planned to use the Labor Day weekend for tying the new IBM 3090 to the $47 billion oil and gas giant's 9,000-user Interactive Computing System.

"We've got it powered up and scheduled to kick in over the weekend," said Ed McDonald, Texaco's division manager for information processing, in a telephone interview last week. "We're putting it into our interactive computing environment, where we run 24 hours a day. But with the three-day weekend, use should be light; so it will be in full operation on Tuesday."

McDonald said his first impression of the high-end IBM system was positive and that it was a state-of-the-art machine that addresses all of his realistic hopes. He said his unrealistic dreams are of futuristic features such as voice controls that replace operator keyboards.

"The major gains that I see, particularly with us becoming more and more on-line oriented, are the addition of extended memory, which will mean increased efficiency in computing power, the reduced

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TOP OF THE NEWS

Discount shopping. Lotus is planning discounts for volume buyers of upgrades to an enhanced version of 1-2-3. **Page 2.**

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NAS upgraded its high end with microcode assist features and expanded memory and channel capacity. **Page 4.**

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As it unveiled a mid-range mini, HP set an early '86 debut date for its next-generation Spectrum line. **Page 5.**

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AT&T Communications chief Randall Tobias, in an exclusive *Computerworld* interview, talks about market share, the Second Computer Inquiry, IBM and "people-oriented downsizing." **Page 8.**

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Two-way street. A close look at Gold Hill and Arity, two new players taking different approaches to artificial intelligence on micros. **Page 10.**

Javelin bucks software trend

Information base vs. spreadsheets

By Edward Warner
CW Staff

CAMBRIDGE, Mass. — Replace the electronic spreadsheet? For most corporate personal computer users, you might as well talk about replacing the coffee machine. Yet a start-up software company here, located a few blocks from Lotus Development Corp., plans this fall to launch a $695 product that it hopes will do nothing less than set a new software standard for computerized financial analysis.

Javelin Software Corp., founded two years ago by two veteran business graph-

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ADR unveils enhanced DBMS tool

Datacom/DB upgrade may boost speed 30%

By John Desmond
CW Staff

PRINCETON, N.J. — A leading relational data base management system, Datacom/DB from Applied Data Research, Inc., received a series of performance enhancements aimed at speeding execution in production environments. Last week's announcement is viewed as central to ADR's strategy to have the product accepted in mainstream IBM shops.

The improvements, which the company said can boost performance by up to 30%, include the use of main memory buffers to save a series of updates for writing simultaneously to a disk. This "pipelining" improves performance by updating the data base with fewer I/O events, according to Ken Sloan, vice-president of research and development for the Datacom/DB system. "The announcement is significant because, up to this point, the flexibility and ease of use of relational systems had not been available to large users. This system solves that problem," Sloan said.

Early users of the enhanced product contacted by *Computerworld* faulted it for minor glitches but praised it for performing better and being easier to use. (See story page 6.)

Robert Cancilla, data base administrator for the Fremont Indemnity Co. of Los Angeles, obtained Release 7.4 of Datacom/DB late last year. The enhancements yielded performance improvements of 10% to 15%, he said. "While not as dramatic as we had hoped, it generally is a substantial improvement, especially in the ease-of-use

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ANALYSIS

Data liberation: Dama on the barricades

By Jeffry Beeler
CW West Coast Bureau

The value a company attaches to a particular scrap of data depends to a great extent on where the data resides.

Store a piece of data in a corporate computing center, and everyone in the organization immediately recognizes the morsel as a strategic resource worthy of extraordinary care. But stick the very same data in a personal computer on some anonymous end user's desk, and its perceived importance instantly depreciates to almost nothing.

The unfortunate tendency to regard decentralized data as trivial is disturbingly widespread and can exact a heavy toll in the form of management headaches, needlessly high overhead and information redundancies or inconsistencies.

But disregard for user-held data is by no means universal. In fact, the indifference has lately spawned opposition that proponents usually refer to as "data administration."

If the cause's standard bearers were political activists instead of technologists, they would probably describe themselves as "data liberationists." In the eyes of data administration's supporters, all corporate information is equally entitled to treatment as a strategic resource, regardless of its physical location.

"Data administration focuses on corporate information [in its totality], not just on the portion that happens to reside in a central mainframe system," according to independent consultant David Schryver, one of the infant movement's most vocal advocates.

With the proliferation of professional microcomputing and the attendant dispersal of corporate information, interest in data administration has grown steadily. One manifestation of this heightened concern is the recent birth and development of the Data Administration Management Association, according to Don Luchsinger, current president of the group's Los Angeles chapter.

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NEWSPAPER

Lotus to offer 1-2-3 discount

Renewal of volume discounts follows pressure from buyers

By Edward Warner
CW Staff

Lotus Development Corp. reportedly plans to sell upgrade copies of its forthcoming new release of 1-2-3 directly to large-volume users — at a discount of $50 off the $150 standard upgrade price for each package.

The plan would mark Lotus' return, under growing pressure from large corporate users, to bulk purchase discounts, at least for upgrades. The distribution plan also exempts large-volume 1-2-3 users from having to return their old 1-2-3 system diskettes as they upgrade, a first for Lotus.

The distribution plan was detailed in a meeting and subsequent telephone conversation between Robert Corr, president of an association of microcomputer managers from 30 Fortune 500-size companies, and Steve Crummey, Lotus vice-president for sales and service, Corr said.

The plan would only affect existing users of 1,000 or more copies of the top-selling Lotus spreadsheet, said Corr, president of Technology Advancement through Strategic Cooperation.

Corr, an office automation director with General Motors Corp.'s Electronic Data Systems Corp. subsidiary, said that Crummey also assured him that users of 1,000 or more copies of 1-2-3 will not need to return their system diskettes to Lotus when they order an upgrade to Release 2, which is expected to ship this month.

Instead, he said, these users will be able to destroy their old system diskettes at their locations as they upgrade.

Crummey could not be reached for comment. Ellen Hoffman, 1-2-3 product marketing manager, said Lotus would not comment publicly on the existence of discounts or special upgrade arrangements for its large-volume users.

Although only existing users of 1,000 or more copies of 1-2-3 would be affected by the discount plan, they would not need to order all of their upgrade copies at once, Corr said. Instead, he explained, such large-volume users could commit to ordering at least 1,000 copies of the upgrade package and receive the discount for initial minimum orders of 250 copies.

Corr said he first learned of the 1-2-3 upgrade plan at a recent meeting he attended with Crummey and 17 members of Technology Advancement through Strategic Advancement. Corr said that Crummey told those at the meeting about Lotus' original plan for a mail-in exchange program and that the attendees requested that Lotus "give us instructions to destroy the [old] system diskettes in the field."

McDonnell Douglas cuts work force

By Clinton Wilder
CW Staff

ST. LOUIS — Four units of McDonnell Douglas Corp.'s Information Systems Group trimmed their payrolls by a total of approximately 340 employees last week in a cost-cutting move. The company also acknowledged a work force reduction of approximately 200 additional positions through attrition and performance-related dismissals since July 1.

The division hardest hit by last week's layoff was McDonnell Douglas Communications Industry Systems Co. in Denver, which trimmed 18% of its 500 employees. Three other larger units cut their staffs by 5% to 6%.

Information Systems Group spokesman Ford Phillips said that the four units affected by last week's cuts were running operating losses and were forced to cut costs to remain on track in the company's long-range plan.

Seven other Information Systems Group units have met or exceeded their target revenues so far this year, Phillips said. The 200-employee attrition cut was spread over all 11 units and affected less than 1% of positions in most units, according to the spokesman.

Phillips said last week's cuts affected employees across the board, including managers in each of the four units and 11 other managers in St. Louis-area divisions. The businesses affected by the layoffs are as follows:

- McDonnell Douglas Communications Industry Systems. The unit dismissed 90 employees, citing slow sales of its information systems to the divested Bell operating companies in the wake of the AT&T breakup.
- McDonnell Douglas Business and Network Systems Co., Cupertino, Calif. The vendor of computer network services issued 100 pink slips, a work force cut of 6%.
- McDonnell Douglas Computer Systems Co., Irvine, Calif. The vendor of minicomputer and mainframe hardware dismissed 85 employees, or 6% of its work force.
- McDonnell Douglas Field Service Co., Irvine, Calif. A 5% cut, totaling 60 positions, was announced at the provider of field service support to McDonnell Douglas and other companies.

"The layoff was a business unit by business unit decision," Phillips said. "These units had business slowdowns, the same as everyone else in the industry, and it was impossible for them to make their target numbers without a work force reduction."

Dismissed employees will be provided with a minimum of two weeks' and a maximum of 13 weeks' severance pay, according to Phillips.

Random access

After months of talking about plans to launch an IBM Personal Computer AT-class system, Sperry's Information Systems Group will formally announce the machine Sept. 16. The system is more than an AT clone, offering an 8-MHz Intel 80286 microprocessor and other features providing significant enhancements over the IBM machine, Sperry officials said last week.

■

AT&T Information Systems this fall will introduce an add-in module for its Unix PC that permits the desktop system to run IBM Personal Computer software. The DOS-73 coprocessor, on a standard controller board, is based on an Intel 8-MHz 8086 chip and includes 512K bytes of internal memory and an IBM asynchronous communications port. It will run popular programs such as Lotus' 1-2-3 in a window under the Unix PC User Agent interface, concurrently with Unix applications, with the ability to access the system's hard disk drive.

Alloy Computer Products, Inc. of Framingham, Mass., will supply DOS-73 to AT&T under a deal to be announced this Tuesday. The product, which will be co-labelled, will be offered in the fourth quarter. Pricing for the card was not revealed, but a retail price below $1,000 is expected.

■

Boeing Computer Services, Inc. has taken the lead in supporting an infant users group that seeks to promote communications standards for offices and factory floors. Company President Robert Dryden formally approved a proposal for Boeing Computer Services to spearhead the cooperative development of the emerging Technical and Office Protocols (TOP) user organization. TOP is a Boeing-developed companion protocol to Manufacturing Automation Protocol, which was developed by General Motors.

■

Multimate International Corp. has signed its first international site licensing agreement with British Railways, according to a Multimate spokeswoman. The deal will cover about 200 sites, with network versions of the firm's word processing packages running on Novell, Inc. Netware local-area nets, she said.

■

Epson America, Inc. is expected to change its name this fall to Seiko Epson America, Inc., according to a source close to the company. Epson America, a printer and microcomputer vendor, is owned by Seiko, the Japanese electronics concern best known for its watches. The name change will accompany Epson America's expansion into consumer electronics products such as LCD screens and television components, according to the source.

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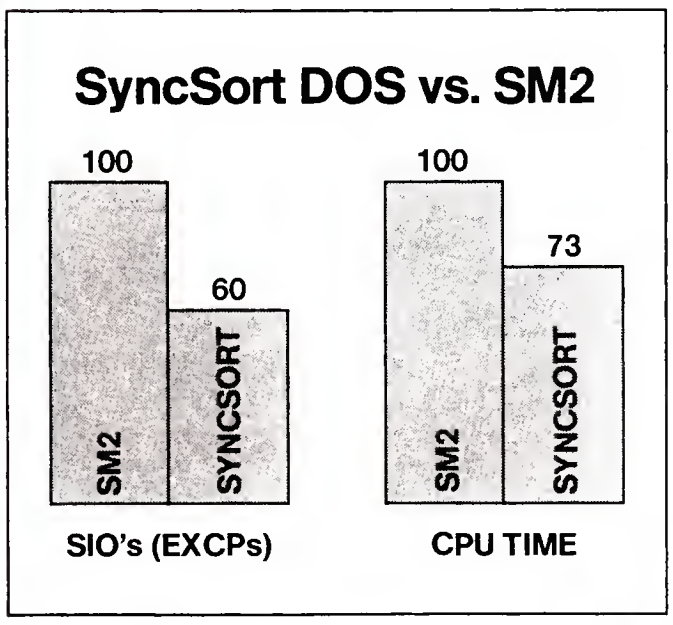

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NAS enhances high-end processor family

By Jeffry Beeler
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — Responding to user demand for increased system performance, National Advanced Systems Corp. (NAS) last week enhanced its high-end processors with the addition of assorted microcode assist features and expanded main memory and channel capacity.

In the wake of the enhancements, company spokesmen here said that NAS has quadrupled to 128M bytes the maximum central storage capacity for the most powerful member of its Advanced System/8000 mainframe family — the AS/8083. As part of the same announcement, the supplier of large IBM-compatible CPUs has also doubled to 64M bytes the top main memory capacity for the 8000 line's other four members — the 8023, 8043, 8053 and 8063.

In addition, NAS has expanded the maximum channel configuration for its AS/9070 and AS/9080 processors from 32 to 48 channels and enlarged the central storage for its 9040 and 9050 from 48M bytes to 64M bytes, the source said. All four mainframe models belong to the vendor's AS/9000 line, which competes with IBM's 3081-series machines.

In a related development, the firm has made the Preferred Machine Assist (PMA) available as a standard feature on its 8000 family, according to Mitch Schoch, director of NAS' North American systems marketing. PMA, which minimizes overhead for systems that run a guest control program under VM, had previously been provided with the 8000 series solely as an option.

NAS has also enhanced the 8000 line to support for the first time Extended Control Program Support:VM (ECPS:VM), which improves mainframe performance under VM by transferring four assist functions from machine instructions to microcode, Schoch said.

The functions, which form ECPS:VM's constituent parts, include Expanded Virtual Machine Assist, Control Program Assist, Virtual Interval Timer Assist and Shadow Table Bypass Assist.

In the past, each of the four microcode features, which Schoch described as "performance kickers," was typically restricted to IBM 4381s or comparable intermediate-scale processors running interactive applications under VM. So when users outgrew their existing 4381-class machines and upgraded to IBM 3083-level processors to increase their capacity, they were forced to abandon their familiar ECPS assist functions and convenience features.

'Best of both worlds'

But now users "can have the best of both worlds," Schoch said. "They can retain the price/performance and the convenience functions of their 4381s" even as they take advantage of the expanded performance of the 8000-series processors, which correspond mainly to IBM's 3083 family of large-scale CPUs.

"Our goal in offering [the four microcode assist functions] on the 8000," Schoch added, "is to position the machines as a true growth path for intermediate systems users."

Each of ECPS:VM's four assist functions is available to 8000 series users without charge. An 8M-byte main memory enhancement for both the 8000 and 9000, however, costs $95,000, compared with $123,000 for an increment of eight channels for the 9070 and 9080.

DATA from page 1

Dama, which seeks to advance the field of data administration, first arrived on the scene about five years ago with the formation of the organization that Luchsinger now heads. Among the association's charter members is Schryver, who preceded Luchsinger as Los Angeles chapter president.

Two or three years later, Dama's original chapter was joined by a second such local group based in San Francisco.

The association is again widening its geographic scope by establishing two more chapters, one in Minneapolis-St. Paul and the other in Seattle. During its roughly six months of existence, the Twin Cities group has averaged more than 60 attendees per meeting, Schryver said.

The Seattle chapter is an even more recent addition to the Dama family of players. It apparently has existed only long enough to meet once or twice, Luchsinger said.

Dama's expansions have swollen its nationwide ranks to about 800 members, Schryver said, and the growth shows every indication of continuing. Luchsinger has received reports about the possible emergence of yet another local Dama chapter, this one in New York, and Schryver speaks optimistically of someday "taking the association national."

Although Luchsinger shares Schryver's aspirations for a nationwide organization, he seems perfectly willing, for the moment, to bide his time. "I think we need to establish a stronger footing locally in some of our chapters before we try to form a group that would operate nationally," he said.

To Luchsinger, Dama's steady growth in both membership and geographic coverage signals an increasing awareness of the acute need to manage data like cash or any other strategic resource. "Many people already have a firm grasp of the issue," he said, "but have done very little to address it because it's so hard to turn things around."

Without divulging any names, Luchsinger cited several large user organizations that have tried repeatedly to establish internal data administration efforts, only to fail miserably because of a lack of commitment by upper management.

To succeed, any attempt to introduce a corporation to data administration requires a champion with plenty of executive clout, he said. "Ideally, the individual should be an IRM [information resource management] vice-president who reports directly to the company's president."

JAVELIN from page 1

ics system developers, plans to achieve this seemingly herculean task by basing its new product, also called Javelin, on what it calls an information base, a structure much like a data base.

Because data entered into Javelin is stored in a data base and not in the rows and columns of a spreadsheet, most of the problems inherent in the use of spreadsheets are avoided, according to Dick Bonzagni, Javelin's vice-president of marketing, who demonstrated the Javelin product recently to *Computerworld*.

Javelin, he said, sidesteps traditional spreadsheet problems, such as the need for all spreadsheet grids to match when their data is combined. The information base, he explained, links numbers with cross-referencing words, such as names or terms, and dates. The words can be from any language, and the dates can be drawn from a built-in calendar. Together, they act as tags to the data, permitting users to call up all data associated with a word, say "expenses," or a particular date.

Just as important, he noted, the words that make up the Javelin information base can be automatically linked and displayed in a flowchart that shows their relationship. Such a diagram could show that a Javelin spreadsheet's underlying logic was for various "operating expenses" of several "divisions" to be combined into "total expenses" and then subtracted from "total revenue."

A spreadsheet, by contrast, gives no overall picture of the train of logic on which it is built. To understand a spreadsheet's logic, the user must backtrack through each of the formulas that form the basis for each of the spreadsheet's rows.

Although Javelin hopes to replace the spreadsheet method of data management, it does not purport to replace the spreadsheet method of business analysis, Bonzagni said. Javelin, he explained, lets users draw data from its information base to create a row-and-column spreadsheet that looks much like that produced by Lotus' 1-2-3 package.

As with 1-2-3, users can do a "what-if" analysis of a Javelin spreadsheet, as well as create line, bar and pie charts. Users can also import files, either directly from 1-2-3 or as Ascii files from such software as Ashton-Tate's Dbase line, Bonzagni said. Ascii files are imported into Javelin as they would be into 1-2-3 in order to permit users to continue to use the download routines they have already written for use with 1-2-3, he added.

Javelin runs on the IBM Personal Computer with at least 512K bytes of memory and two diskette drives.

The company plans to begin shipments of Javelin this fall when there will also be a formal introduction of the product. In the interim, Javelin officials are demonstrating the program for individual members of the press. Though he declined to discuss distribution details, Bonzagni said the product will be directed at end users and MIS departments.

Javelin's biggest shortcoming is expected to be its requirement that all of its users adopt the same names for the same data if they expect to share data or combine their spreadsheets into one.

Bonzagni, however, maintained that this feature actually represents a potential asset to MIS management in that it can be the basis on which standard names are set for the data manipulated by all of the firm's personal computer users.

Straitjacketing standardization

Spreadsheets, Bonzagni maintained, require an even more straitjacketing standardization — the use of the same grid by every user. If one of several spreadsheet users departs from the standard spreadsheet grid — eliminating the row where, say, sales for a certain date are recorded — the error will invalidate the spreadsheet that results when the several spreadsheets are combined.

That, Bonzagni said, is one of the spreadsheet faults prevented by Javelin's information base.

Those with little or no spreadsheet experience can use Javelin more easily than a traditional spreadsheet, like Lotus' 1-2-3, he said. Unfamiliar users, he explained, could choose to enter data to the information base by drawing a chart or graph, a twist on the usual spreadsheet formula in which graphs are used with output.

Bonzagni also pointed out a feature called The Speller, which he said memorizes all of the commands, file names and terms entered by the user.

A dictionary of those terms and commands is available in a pull-down window from which users can cut and paste words for use as spreadsheet labels. They can also invoke commands from that dictionary, as they would using macros.

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HP commits to Spectrum, boosts 3000

PALO ALTO, Calif. — The next generation of Hewlett-Packard Co. minicomputers, high-end systems based on the company's Spectrum architecture, will be introduced in early 1986, according to company President John A. Young, who also promised a smooth software migration to the new systems.

Young last week made his first public commitment to a time frame for Spectrum while announcing a mid-range system and upgrades for the HP 3000 family of business computers. The mid-range system is the HP 3000 Series 58. The upgrades are from the previous mid-range system, the HP 3000 Series 48, to the Series 58; and from the HP 3000 low-end systems to the HP 3000 Series 42XP.

"Our commitment to protecting customer software investments remains a central goal of the Spectrum program, not only for future HP 3000 products but also for future high-end HP 1000 real-time systems and HP 9000 design systems. With hardware development and testing virtually completed for the first products of the Spectrum program, our attention is fully focused on making software migration as smooth as possible," Young said.

The Series 58 is said to feature 50% higher performance than the existing Series 48 with the help of a 32K-byte memory cache and double the maximum main memory at 8M bytes.

The other upgrade announcement was that existing HP 3000 Series 39, Series 39HP, Series 40 and Series 42 systems can be upgraded to the new Series 42XP to achieve performance gains of 25% to 40%, according to the company. The Series 58 costs $94,500. Field upgrades for the Series 42 and Series 48 cost $37,500. Upgrades for the Series 39, Series 39HP and Series 40 cost $40,000.

Report to look at terminals

The *Computerworld* Oct. 28 Special Report on data communications terminals will examine new terminal technologies, specifically, high-resolution color graphics terminals and terminals with integrated voice/data telecommunications options.

Article contributions are now being considered and should take one of two forms: A tutorial article discussing an issue or an application story outlining a user's experience.

Articles must be typed, double-spaced and range from three to five pages. Artwork is welcome.

If you have a story or an opinion, contact Janet Fiderio, Special Reports Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

CDC to offer office automation software

Century Analysis fits product to NOS/VE

MINNEAPOLIS —. Another mainframe hardware vendor is seeking to protect its turf by offering its users office automation software. Control Data Corp. last week announced an agreement with Century Analysis, Inc. to port that firm's OA software to CDC processors.

The CDC entry will run under the company's NOS/VE operating system on the full range of CDC systems, from the entry-level Model 180 to the high-end Model 990.

CDC spokesmen said the resulting package is intended to offer functions equivalent to those of Digital Equipment Corp.'s All-In-One, IBM's Professional Office System and Data General Corp.'s CEO office automation software.

The CDC software is scheduled to be available sometime in 1986, a spokesman said.

The development agreement appears to be CDC's attempt to stem the loss of users to competitors due to a lack of OA software, rather than an effort to win new customers. CDC has made its mark in the industry selling number-crunching processors for scientific applications.

Because of the company's mainframe orientation, Century Analysis was chosen to port its Officeware OA software to run under NOS/VE, a CDC spokesman said.

The Officeware packages include word processing, spreadsheets, business graphics and record management applications.

Officeware Applications for networking include electronic messaging and document transfer, shared scheduling and shared printing and archiving.

The Cyber 180 version of Officeware may include a distributed processing environment, enabling users to access word processing and spreadsheet applications locally on personal computers or by tying into the Cyber 180 mainframe.

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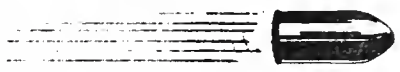

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PDSFAST	3 min. 23 sec.	8 sec.	712	$4.22
12 cyl. PDS Copy				
Iebcopy	9 min. 14 sec.	1 min. 20 sec.	10,792	$18.47
PDSFAST	48 sec.	.7 sec.	122	$1.75
47 cyl. PDS Unload to Tape				
Iebcopy	58 min.	14 min. 52 sec.	97,253	$92.05
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SOFTWARE ENGINEERING OF AMERICA SEA

ADR from page 1

features and the reduction in manpower required to operate the system," Cancilla said. "It's closer to a 24-hour environment, but it's still not there," he said, noting he still has to shut down his on-line system when he needs to perform certain maintenance tasks.

Datacom/DB's enhanced Data Query interactive relational query facility "has a long way to go to be a real user-friendly tool," Cancilla said. Data Query needs to be more closely integrated with the data dictionary to give users a good explanation of the data they have retrieved, he said.

Haydon Gaines, manager of data administration at Equitable Life Leasing Corp. of San Diego, a company that leases computer equipment mostly to Fortune 500 firms, began using Release 7.4 of Datacom/DB a month ago.

"We've had pretty good response" with the enhanced Datacom/DB, Gaines said. "Users notice the difference. Their screens come back faster, and the file size is the same. The file accesses and queries are much faster."

Some jobs that previously took one hour to execute now take 15 minutes, he said. "The pipelining and clustering features really increase performance on the large sequential-type files," such as accounts receivable and fixed-assets applications from Management Science of America, Inc., he said.

Several analysts observed that the announcements were made with an eye toward the No. 1 player in the DBMS market — IBM, which earned $600 million from DBMS-related sales in 1984 — and its DB2 relational DBMS.

Shaku Atre, president of Atre International Consultants, Inc. of Rye, N.Y., said the Datacom/DB enhancements are intended to exploit the Achilles' heel of ADR's biggest competitor. "They are trying to make the best of the weakness of their opponent," Atre said, noting that IBM's DB2 has been criticized by some of its users for being too slow. "ADR is being very creative in trying to come up with features to compete with DB2. The main thing they needed was performance improvements."

One analyst said the Datacom/DB enhancements appear to deliver on the promise of a unified solution fulfilling both user and production requirements. According to Damian Rinaldi of International Data Corp., a Framingham, Mass.-based market research firm that recently ranked Datacom/DB as the No. 3 independent DBMS, "Current relational models can't provide the support users need. Most represent compromises that provide a subset of ease-of-use features without sacrificing performance. What ADR is doing here is [addressing] the trade-off of meeting users' needs without sacrificing performance."

Peter Lowber, of the Boston-based Yankee Group, added, "Performance has been an issue. This will help ADR compete more directly with [Cullinet Software, Inc.] in high-performance transaction processing environments."

■

Enhanced Datacom/DB version includes storage management

Highlights of the Applied Data Research, Inc. (ADR) data base management system announcement included the following:

■ Datacom DB 7.4, succeeding 7.3, offers storage management options, including clustering, in which related data is physically stored together to optimize the relational Join command and to speed the processing of related records. Other space management options permit Datacom DB to be tuned for the processing pattern of applications.

The enhancements allow tasks to be processed in priority when multiple tasks are available for servicing. With user-specified parameters specifying the detail, accounting information is provided using ADR's Ideal fourth-generation applications development system and Data Query interactive relational query system.

■ Ideal 1.2, succeeding 1.1, features enhancements to the data manipulation language that take advantage of the extended Compound Boolean Selection Facilities in Datacom/DB. Early support site users of the product spoke highly of the extended facilities. The Boolean feature simplifies the task of building files from data stored in different physical data bases, a spokesman said.

New screen processing options in Ideal include support for the IBM 3279 color terminal, extended highlighting, increased print and Help command processing and enhanced cursor control. Data transmission overhead has been reduced by shortening the length of IBM 3270 data streams. Release 1.2 also reduces the CPU overhead required to generate data streams and streamlines the user sign-on and virtual storage requirements of screen definition panels.

Ideal's printing services have been extended to printers networked under control of IBM's CICS.

■ D-Net 1.2, succeeding 1.1, enhances Datacom/DB's distributed data network manager for organizations with multiple IBM mainframes at one location. D-Net now provides high-speed channel-to-channel coupling for stand-alone IBM MVS and MVS/XA host systems loosely coupled with IBM's Multisystem Channel Communication Unit. The channel-to-channel support is said to allow organizations to distribute and share data base processing among multiple CPUs more easily.

The updated D-Net also provides full concurrent update protection and restart and recovery and transaction back-out services. System maintenance and changing of the data base can be performed without interrupting on-line processing.

■ ADR/DL 2.1, succeeding 2, more closely integrates the company's high-level Cobol language facility for Datacom/DB with ADR's active Data Dictionary. The enhancement is said to give data base administrators tighter control of the use of data views, especially in large MIS shops.

The updated ADR/DL release provides for relational operations on Datacom/DB using the Boolean facility. ADR/DL's relational data base management language is now modeled after Ideal's, to provide consistent methods for developing applications, a spokesman said.

■ Vsam Transparency 2, succeeding 1.1, allows users to restructure Vsam records into Datacom/DB to get more use of its relational capabilities and to allow non-ADR software to be migrated to the data base. Data can be transferred from Vsam to Datacom/DB and can be restructured automatically. The updated release eliminates relinking of batch programs previously needed to activate the Vsam Transparency, lessening the demand for computer resources.

■ CICS Service Facility 2.3, succeeding 2.2, has been enhanced for sites running MVS/XA. The facility can now accept calls from CICS application programs that are running above or below the 16M-byte line.

■ Data Query 3.1, succeeding 3, has been updated to support the Japanese Kanji language. The product also supports English, French and German. Enhancements to Data Query are aimed at improving on-line and batch sort functions.

The price for the enhanced ADR/Datacom System, provided free to users with maintenance agreements, is $116,000 for users in IBM DOS environments and $145,900 for IBM OS/VS1, MVS and MVS/XA users.

— John Desmond

■

Users cite performance gains, glitches in early Release 7.4

It had some glitches, but it did improve performance, said three users of an early version of Applied Data Research, Inc.'s (ADR) enhanced Datacom/DB relational data base management system.

Robert Cancilla, data base administrator for the Fremont Indemnity Co. of Los Angeles, obtained Release 7.4 of Datacom/DB late last year. His shop runs an IBM 4381 Group 2 with 8M bytes of main memory, the DOS/VSE 3.5 operating system running under VM and CICS 1.6.

He was an early suport customer of the enhanced Datacom/DB, ADR/DL Cobol language facility, Data Query interactive relational query system and CICS Service Facility.

His shop processes, in an average eight-hour period, 135,000 CICS transactions and 1.5 million data base service requests, Cancilla said. In 24 hours, he said, the shop processes some 5 million data base service requests.

Performance improved from 10% to 15% in his shop with the enhanced Datacom/DB, Cancilla said. While performance was impressive, enhancements to make the data base available for 24-hour updating came up slightly short for Cancilla.

"They claim you don't have to shut the software down to make changes. But realistically, you have to disable one or more tables or files to maintain the system. We can't shut down one piece and continue running. [ADR] still can't make maintenance changes on the fly while the world is still operating," Cancilla said.

The Data Query facility is used by 40 end users in Cancilla's shop. Those users, many of them in management, retrieve up to 40,000 records in a single query. With the enhanced Datacom/DB, "the overhead is not that noticeable. It does not degradate processing at all." Cancilla said he would like to see Data Query more closely integrated with ADR's data dictionary.

ADR's pipelining enhancement, whereby a series of data base updates are held in a main memory buffer for updating all at once, initially caused a problem for Fremont Indemnity. "Their pipeline had a leak in it. When we first got it, it had a gaping hole that poured data out of the machine. It just disappeared," Cancilla said. The company has since fixed the glitch to Cancilla's satisfaction.

The Compound Boolean Selection Facilities of Datacom/DB 7.4 were well received by Cancilla's programmers.

Robert Burkhalter, data base administrator at the Independent Life Insurance Co. in Jacksonville, Fla., began using Release 7.4 of Datacom/DB in April. The company's two IBM 3033 mainframes were at the saturation point, so the DP shop agreed to become an early user in the hope the performance improvements would forestall the need for replacement hardware. The Independent Life DP shop has heavy on-line transaction processing and batch processing demands.

While the enhanced Datacom/DB has extended the useful life of the company's mainframes, Burkhalter said, "we'll still need a machine at the same time. The difference is we'll have more being processed at that time."

The Boolean facilities feature was praised by Burkhalter, who said it significantly reduces I/O and thereby improves performance.

Haydon Gaines, manager of data administration at Equitable Life Leasing Corp. of San Diego, a company that leases computer equipment mostly to Fortune 500 firms, began using Release 7.4 of Datacom/DB a month ago. The company has an IBM 4341 Group 2 with 8M bytes of main memory. The DP center is transferring its processing to the mainframe from Honeywell, Inc. and Digital Equipment Corp. processors that belong to two firms that were merged two years ago to form Equitable Life Leasing.

The company has 25 terminals on-line in the production environment, with plans for another 100 to go on-line from the home office and sales offices and another 29 eventually from branch offices.

All applications are now being written in Ideal, a total of 800 so far, Gaines said. "In one year, we put together a system with 15 programmers that would have taken 100 programmers two years to do in Cobol," Gaines said.

Equitable Life Leasing has had only one problem with the updated Datacom/DB since having it installed. "If we read a file three times, and it didn't find what it wanted, it locked up the data base." ADR technicians responded quickly and fixed the bug within two days, he said.

One suggestion for further improving Ideal would be to offer more than three pages of help information per screen, Gaines said. To provide for its own sophisticated Help system, Equitable Life has written its own code to provide the maximum number of Help screens users require, he said.

On the whole, Gaines is happy with the Datacom/DB enhancements. "There's a few little quirks to work around, but the nucleus is pretty solid," he said.

— John Desmond

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Randall L. Tobias

CW PHOTOS BY GOEFFRY O'CONNELL

AT&T is feeling the growing pains of divestiture everywhere, most recently in last month's announcement to eliminate 24,000 jobs in the Information Systems division. AT&T Communications, the company's long-distance services arm, has been plagued by delays in its private-line installation, by increasingly competitive players like MCI Communications Corp. and by its perpetual lobbying against the remaining shackles of government regulation.

In the center of the AT&T Communications storm is Chairman and Chief Executive Officer Randall L. Tobias, at 43, the youngest member of AT&T's top management team. A 21-year Bell system veteran, Tobias was promoted to his current position from senior vice-president of AT&T, where he specialized in regulatory and legislative policy issues.

Interviewed by* Computerworld *staff writer Clinton Wilder recently in his office at AT&T Communications headquarters in Basking Ridge, N.J., Tobias shared his views on the Federal Communications Commission, the partnership between IBM and MCI, equal access and competition for the business and residential long-distance market.

You have been quoted as saying that the long-distance marketplace is now a competitive one. But your competitors insist that it is not, since AT&T still has an enormous market share. In long-distance market share figures, [GTE Sprint Communications Corp. President] Don Prigmore in a recently published forum on deregulation charged that AT&T had a 90% market share, while you maintained that it was only 64%.

Market share isn't even relevant. Market share suggests that you have the ability to do certain things, whereas it is really market power that is significant. Regardless of our market share, we don't have the market power that would permit us to do the kind of things that people in some corners accuse us of.

But people, including yourself, still use those numbers.

Our number, the 64% figure, is based on the traditional definition of long-distance service.

Yet Prigmore and others like to ignore that definition and say, "No, that's not what we're talking about; we're going to define the long-distance market differently."

My parents live in rural Indiana. For all I know, we have 100% of the market there because nobody else is willing or interested in serving those markets.

If you look at certain high-profit segments of the market, then our market share is much lower where there is particular price sensitivity. What's the relationship between lower market share and competitors passing along only part of subsidy? That's not because our [lower priced] competitors are passing along real savings. They are passing along only part of the subsidy that they get because of the discount in access charges. But they are siphoning off some of that subsidy and keeping it for themselves. It is the American public that's getting gouged as a result of all that.

If you were truly deregulated, what assurance would there be that rural Indiana would still have complete long-distance service, if it's not a profitable enough market to be in?

Oh, I think it's profitable enough to be in. The issue of abandonment of markets is an issue that I think a lot of people in rural communities used to be concerned about, but I don't think they are concerned about it particularly any more. A lot of the [digital, fiber-optic] technology kind of makes that problem go away. We just established telephone service to Pitcairn Island in the Pacific. That is a very good example of something that did not cost much to do because of the nature of the technology that is already there. We hooked some links together, and it was no big deal.

There is also the perceived threat of price deaveraging. I don't know where prices are likely to go, but one thing I am pretty certain about is that whatever changes are made, they are going to be made on the basis of volume, not geography, because that's where the real cost trade-offs are.

I recently asked [MCI Communications Corp. Chairman] Bill McGowan to respond to your published comments about deregulation in light of the IBM-MCI hookup. His response was that IBM owned all of Satellite Business Systems [SBS] before the deal and now has only 16% of MCI, so he was trying to downplay it. How do you respond to that?

I think the facts are self-evident. First of all, you have a company, in IBM, that . . . is not a newcomer to the information business or the telecommunications business. Here is a company that has looked around at the opportunities and decided to build a relationship with MCI. With that, it can take its traditional business, the [Rolm Corp. private branch exchange] business that it's purchased, and what they had in SBS, plus MCI now, and leverage all of that in the marketplace.

Here's a company that's bigger than AT&T, that's got all of these strengths. It is just ludicrous to me that somebody would say that because we didn't change our name — because when we were the Bell system we were called AT&T — that we ought to continue to be fettered with the regulations that may have been appropriate for the Bell system when it was called AT&T. [Regulation] clearly no longer makes any sense for a company that isn't even the biggest company in this whole information movement and management business.

In terms of the technical directions that you would like to move in the data communications market, how is [the Federal Communications Commission's] Second Computer Inquiry keeping you from doing what you would like?

In code and protocol conversion, [Computer Decision II] addresses something called enhanced services, and nobody knows what that is. It is based on a premise that says you can divide the world up and put it in nice, neat, little packages — data processing is here and communications is here — and, therefore, you can't do certain things under the provisions of [Computer Decision II].

As a result of those prohibitions, the marketplace and the consuming public are kept from the benefits of things that we know about . . . and from the benefits of things that we don't even know about because there has been no way for those synergies to be developed. I don't think we even know what we are missing.

[Computer Decision II] was established at a time when there was concern about the Bell system and its ownership of local dial tone and the alleged bottleneck associated with it. Then the divestiture came along and solved the problem more permanently than [Computer Decision II] did.

I am often asked if I am pleased that the FCC appears on the verge of doing something about [Computer Decision II]. [The answer is] "yes," except it is hard to be excited about something that should have been eliminated on Jan. 1, 1984, if not before.

What do you think about the speed at which FCC Chairman Mark Fowler is bringing about deregulation?

I understand the political problems, and I understand the realities and all of that, but when you're bleeding to death, it's hard to have a lot of patience with problems that should have been resolved a long, long time ago.

We are trying, for example, to introduce a service called Proamerica [targeted at] small businesses. Anybody else in the marketplace that wants to introduce their version of Proamerica could decide this afternoon they wanted to do it and have it in the marketplace tomorrow. We introduced it in April, filed the petition with the FCC and we still don't have permission to put it in.

I don't understand how that is possibly in anybody's interests, other than perhaps some competitors whose interest is served by keeping prices artificially high in the marketplace.

Do you think the current equal access plan will work?

I think it will work because all the players are going to work hard to make it work, at least speaking for us. But do I think it's a good idea? That's a different question.

A very large percentage of our customers understood the rules to mean that if you are happy with what you have, you don't have to do anything.

So for the government to come along and say that it is now going to make that decision for you, and after the public's been jerked around so much in all this transition . . . I am disappointed

See **TOBIAS** page 9

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NEWS

TEXACO from page 1

air-conditioning and power load requirements, without which we would have had to do some major building improvements, the physical space itself — the footprint — and the increased level of error handling and recovery," McDonald reported.

More than 12 mainframes

Texaco, which was one of several companies to receive the dual-processor Model 200s last week, has more than a dozen mainframes dispersed throughout two major data centers here and in Tulsa, Okla. The company plans to add at least two, and possibly three, Model 200s by the end of 1985 and plans to upgrade the Model 200s to quadratic processor Model 400s when those systems become available in late 1986 or early 1987. Texaco's first 3090, acquired under a third-party lease, was ordered in February when the 3090 line, also known by its development code name Sierra, was announced. McDonald said the 3090s will gradually replace combinations of IBM 3080-type systems.

"In an interactive environment," he added, "there are a couple of things going for the 3090, including the extended storage. We are hoping for a lot faster response, although we haven't figured it out exactly. There are always a large number of potential bottlenecks standing by making sure you don't get the response rate you hope for in the early going. It may be channel paths, communications lines or anything. We do anticipate a 10% improvement over the main CPU ability in the 3080s. It will probably take us two weeks to adjust our parameters and get full performance, which will be just about the time that the next 3090 rolls in the door."

The first Texaco machine contains an extended memory of 128K bytes, rather than the standard 64K bytes, and runs under IBM MVS/XA. It is being placed in an IBM JES3 multi-CPU environment using IBM TSO. That environment, supporting the Interactive Computing Center, is in use at both data centers, as is a second environment, IBM's JES3 IMS, which supports transaction processing such as payroll, personnel and financial applications.

The Interactive Computing Center is an information center-based concept under which Texaco provides decision support to managers and technicians through its multiple 3090 and 3080 mainframes running a variety of data base management systems and connected by an IBM Systems Network Architecture network.

According to McDonald, the only software changes required to prepare for the 3090's arrival involved upgrading two components of MVA/XA — an error recovery routine and the XA nucleus itself — to a higher release level.

He said that the autodial facility, in which the 3090 "does like E. T. and phones home when something goes wrong," allows the system to notify automatically the operator and telephone an IBM service center when the computer has a technical malfunction.

McDonald said that feature does not present a security problem because the feature provides no access to the data path.

McDonald noted that the specifications for the Model 200 list its footprint as 452 sq ft and weight as 13,000 lb, compared with 657 sq ft of floor space required for the 20,000-lb IBM 3084.

He reported that space for his 3090 was cleared over the course of several months as Texaco upgraded its banks of disk drives.

TOBIAS from page 8

in that from a public policy view.

Is the Integrated Services Digital Network [ISDN] really a key goal for AT&T, or will communications technology eventually evolve to all-digital anyway?

No, I think our strategy is fundamentally one that accommodates ISDN, and I think that it's very important. I think that we've got to have connectivity that finds the world as it is and makes it as transparent as possible.

If AT&T Communications faces the same type of competition and profitability pressures as AT&T Information Systems, what assurances are there that you might not have to undergo the same kind of job cut?

We've got to be, in my judgment, the low-cost supplier in the marketplace. That means we have to be constantly reexamining the cost structure to determine how we get this job done better with less cost.

Having said that, we do not foresee, either now or in the future, a need for the kind of people-oriented downsizing across the board in the organization in communications that we're all dealing with now in AT&T Information Systems.

That is not to say that we won't have pockets of surplus here and there around the organization. We have 120,000 people here, and I think it would be foolish to think that there won't be places in which we will find ways to do things more efficiently, and there will be people impacts.

In conclusion, I obviously wouldn't ask you to assess your chances, but would you like to replace [AT&T Chairman of the Board] Charles Brown someday?

That is not one [area that] I spend a lot of time thinking about. We have the good fortune here of having a very capable senior management team, and I have a lot of confidence in all of those people. I think one of the strengths of this organization is that we do not spend any time worrying about that kind of an issue.

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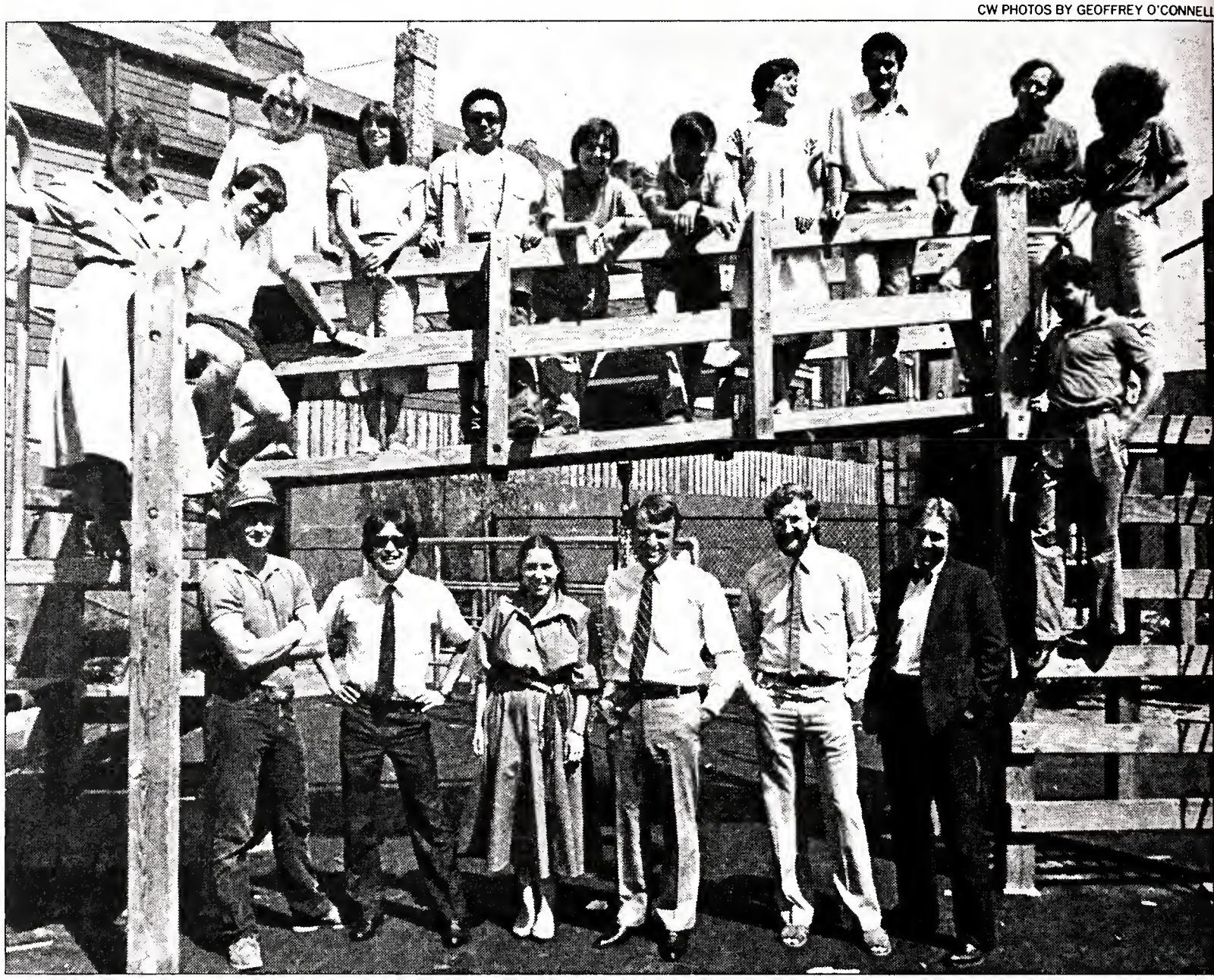
AI firms outgrow seat-of-the-pants style

Professional style ascendant as tools come to marketplace

CW PHOTOS BY GEOFFREY O'CONNELL



Gold Hill Computers staff outside the firm's Cambridge, Mass., headquarters.

By Eric Bender
CW Staff

The offer to join Gold Hill Computers, Inc. as president was tempting, but Carl Wolf came up with one non-negotiable demand: the bomber flights must end.

Like many other members of the East Coast artificial intelligence community, Gold Hill's vice-president for research and development, Gerald Barber, liked to fly around in a colleague's World War II bomber. As one passenger later joked, if that plane crashed, it would take the U.S. fifth-generation computing effort with it.

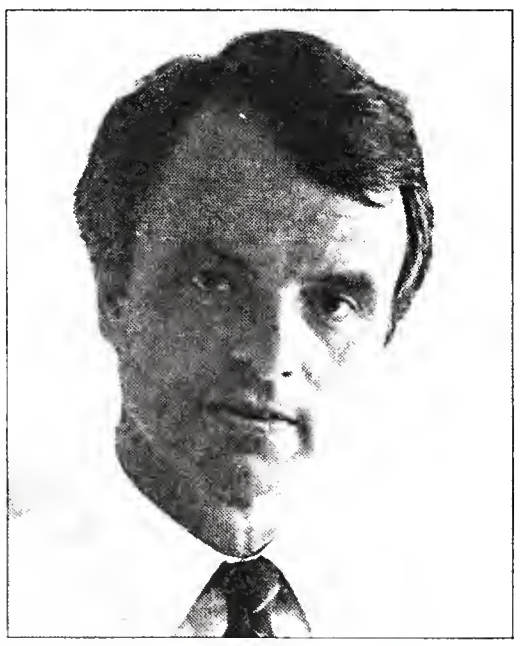
Risking prime technical talent this way did not appeal at all to Wolf last spring as he considered the risks of leaving the presidency of Interactive Data Corp. He joined the small AI micro software firm, but he asked that Barber be grounded.

In a small way, Wolf's request demonstrates the way the firms now vying to supply micro-based AI tools are following in the footsteps of earlier entrants in the AI arena, making the transition from seat-of-the-pants to professional management.

And, again like the AI pioneers, they must stay tightly focused on practical uses of the technology. For the moment, "there's a lack of demonstrable, successful applications," Wolf acknowledged, although he and many others predict that the situation will change by early next year.

Gold Hill and Arity Corp., another supplier concentrating on the IBM Personal Computer family that shipped its first products last year, highlight the promise and current status of AI tools on micros.

The founders of Gold Hill — Barber, Stanley Curtis (vice-president for consulting and training) and John Teeter (vice-president for engineering) — met as students at the University of Idaho. After holding various jobs in industry and academia, the three started Gold Hill in 1982 to develop AI products for personal computers. Based a few blocks from MIT in Cambridge, Mass., the company is named for Teeter's Idaho farm.



Wolf

Gold Hill took its technical points of departure for its current products from the Intel Corp. 8086 family, with prime emphasis on the 80286 chip, and Common Lisp, a Lisp dialect then beginning to emerge as a standard under the sponsorship of the U.S. Department of Defense Advanced Research Projects Agency.

Along the way, Gold Hill joined forces with Carl Hewitt and Patrick Winston, two AI gurus at MIT who continue to serve on the company's board. The firm also worked jointly with Symbolics, Inc. last year on a well-publicized knowledge system venture for Shearson Lehman Brothers, Inc., a subsidiary of American Express Co.

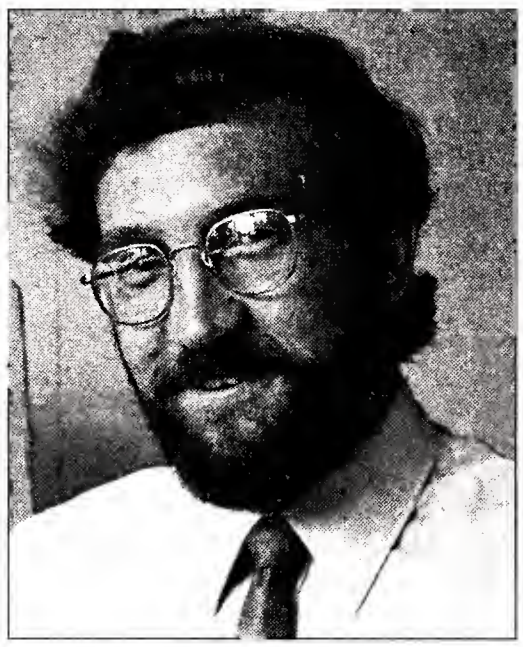
The company began shipping Golden Common Lisp, the first Personal Computer implementation of Common Lisp, last November. The package has been sold to approximately 3,000 customers, primarily large corporations, Wolf said.

Gold Hill's initial marketing plan targeted end-user applications as well as development tools. But Wolf, who pointed out that few software firms have prospered by offering both languages and applications, drastically redefined the plan. The main thrust now is to establish Golden Common Lisp as a micro AI standard. The firm will then extend the product line with additional development tools and service offerings.

"The business community is waiting for a [Cullinet Software, Inc.] to come along and help them into AI," Wolf suggested. "We want to be the Cullinet of this industry."

The company currently employs 18 people and has a monthly run rate of about $200,000, Wolf said. "With people like Carl Hewitt and Gerry Barber, we could make a lot more money than this in consulting," he remarked, but the strategy should pay off down the road. Gold Hill's revenue goals are $2 million this year, $9 million next year and $17 million in 1987, he added.

One key offering, scheduled for commercial availability by year end, is a large-memory version of Golden Common Lisp designed for the Personal Computer AT, which will directly address up to 16M bytes of internal memory.



Barber

While the standard Personal Computer offers "acceptable performance for many applications, "the big problem is memory, and I think the [AT] solves that," Barber said. "The AT will be where the action is in AI in a few years — it certainly has the power, and it's going to be everywhere."

Barber predicts a turn toward networked development environments, with ATs hooked to dedicated Lisp machines, as at Gold Hill. "Symbolics is never going to build a workstation as cheaply as IBM," he commented. A network supporting Common Lisp on all nodes will permit developers to do much of their work on the AT, then send it over to the dedicated machine for compiling and other CPU-intensive tasks, he said.

In another major step, during first-half 1986, Gold Hill will move into the expert systems shell arena. "Our market research tells us there are two to 10 times the number of people willing to program at this level as are willing to program in Lisp," Wolf commented. "It's a much, much bigger ball game."

Here, Gold Hill will compete with AI software pioneers such as Intellicorp, the Carnegie Group, Inc. and Teknowledge, Inc.

The approach will be to offer products that are not as powerful but that are easier to develop and maintain, Wolf said.

While many firms are offering AI languages on personal computers, Wolf listed three main competitors: Lucid, Inc., Expertelligence, Inc. and Arity. Among those, only Arity has targeted IBM micros.

Located in Concord, Mass., about 20 miles west of Gold Hill's headquarters, Arity was started by Lotus Development Corp. alumni. President Peter Gabel, who has also flown on that bomber, was an early Lotus employee and subsequently ran Lotus'

Advanced Development group. Arity R&D Vice-President Paul Weiss was a member of the group.

The two formed Arity in the spring of 1984. The company's first commercial products, a Prolog interpreter and a compiler/interpreter package, shipped last April.

Gabel, left, and Arity Vice-President for R&D Paul Weiss

Arity adhered to the Prolog core defined by a standard computer science textbook while modifying it for the Personal Computer, Weiss said. The firm also put in a series of extensions for tasks that traditional Prolog does not do well, including the handling of text strings.

The Arity packages also offer hooks to C and assembly languages for the 8086 family. "This distinguishes us from a lot of [personal computer] companies," Gabel pointed out. Another difference is that Arity will not charge royalties on runtime versions. "If Prolog is to become more successful, it must be more commodity-like," he maintained.

While software vendors represent the largest group of Arity customers, classic DP shops run a close second, according to Gabel. Particularly in insurance firms and banks, these shops are building micro packages designed to provide intelligent interfaces to mainframe data. "Prolog happens to be a perfect kind of language to do this," Gabel said. "Prolog has a natural connection to data bases."

One customer — whom Gabel declined to identify — is a leading mainframe data base management system vendor,

See **GOLD** page 12

Vendors fuel AI language debate

Software exec sees ease of use boosting Prolog

The long-running debate over the virtues of the Lisp and Prolog languages — which often strikes non-AI-types as primarily a flexibility vs. performance argument — shows few signs of abating among micro software vendors.

"Prolog will fail as a foundation for AI," said Gold Hill Computers, Inc. director Carl Hewitt, who designed Planner, an important predecessor to Prolog. "You can build little things on top of Prolog, but it doesn't make a good foundation." Lisp, however, does make a good foundation for Prolog, he said. "It's a one-way valve in software."

Arity Corp. officials, however, responded that both languages are general-purpose tools suitable for a very wide range of tasks. For the same quality of implementation, Prolog will always run better," Arity President Peter Gabel claimed.

Lisp emerging as standard?

Prolog does not burden the CPU the way Lisp does in garbage collection, and it has other advantages including built-in pattern matching, he said.

Adopted as a standard for the U.S. Department of Defense Advanced Research Project Agency's Strategic Computing Initiative and available from a quickly growing list of vendors, Common Lisp is becoming this country's standard AI development language, Gold Hill executives said. No equivalent Prolog standard exists, they maintained.

"For all the propaganda about Common Lisp being a standard, it's anything but," Gabel said, noting the current difficulties in porting between various machines running a version of Common Lisp. He also said that the government is backing off on its Common Lisp emphasis and that Franz, Inc.'s Franz Lisp remains the most popular implementation in government use.

Prolog 'starting to catch on'

Lisp is taught at about two-thirds of the universities that support large computer science departments, estimated Gold Hill marketing Vice-President Eugene Wang. Gold Hill Director Patrick Winston's Lisp primer has sold 80,000 copies.

"There's a lot of movement in the universities to bring Prolog to students. It's much, much easier than Lisp, maybe slightly easier than C, for programmers to pick up," Gabel said. "This, in large measure, is why Prolog is starting to catch on."

Both companies emphasize that they are not language fanatics; instead, they are in the business of selling software tools. They acknowledge that both languages have a place in the marketplace.

But they also practice what they preach. "We're probably the only company in the world that does its accounts receivable on a [Symbolics, Inc. machine]," Gold Hill R&D Vice-President Gerald Barber noted.

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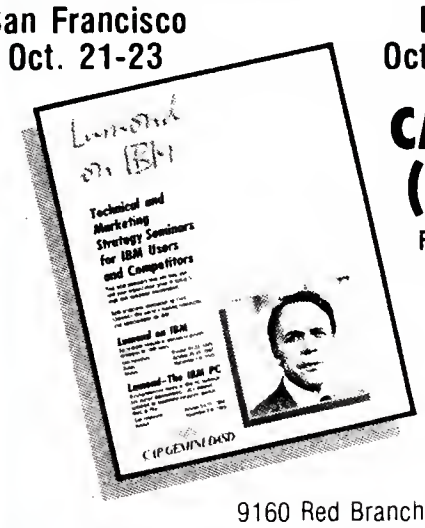

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Experts beat out expert systems at financial firms

Insurance official cites harder implementation

By Charles Babcock
CW New York Bureau

NEW YORK — Despite frequent announcements of expert systems, there are few available that can help a financial institution improve its business, said a Metropolitan Life Insurance Co. technical planning official.

Roger J. Jones, planning manager in Metropolitan Life's corporate systems planning division, recently told the members of the Association for Women in Computing that human experts are harder to duplicate than expert system advocates admit. In many cases, it is so expensive to encode the thinking of an expert that a bank or insurance company prefers training its own experts.

"What if the expert lies to you? What if the expert is wrong and just lucked out? What do you do when the business the expert told you about changes?" Jones asked.

These uncertainties are what expert system advocates label "research questions," he said. Some experts are so possessive of their special knowledge or threatened by the prospect of having their skill put into a computer that they covertly sabotage the expert system building process, he noted.

Jones said Metropolitan Life constructed an expert system to perform the underwriting function on personal insurance policies. Underwriters typically evaluate a mass of information about a client to determine the degree of risk he represents to an insurer.

Metropolitan Life's expert system evaluates the information to see if it is sufficient to determine risk, then it decides whether the prospect represents a standard or substandard risk to the company.

The giant insurance company found that it cost more to have someone transcribe 20 to 30 pages of medical information from doctors into the system than it did to have an underwriter evaluate the information the way it came into the office.

In addition, insurance companies are under pressure to use larger pools of cases in determining actuarial tables, which makes an expert system based on today's risk conceptions out of date. Insurers, for example, are shifting away from relying on pools that separate men from women in the actuarial tables.

Jones said the underwriting system was "built as a technical proof. It was never intended to be installed," and isn't currently working as a production model. Metropolitan Life simply made it a corporate objective to

See EXPERT page 13

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Gold Hill, Arity offerings

Gold Hill Computers, Inc.'s Golden Common Lisp costs $495 and runs on IBM Personal Computers and compatibles with 512K bytes of internal memory, with a hard disk drive recommended. A second release of the product and a $495 compiler are both scheduled for commercial availability in November. Runtime software pricing depends on volume, starting at $100 for a single unit.

A native-mode version for the Personal Computer AT will ship in December for $695. Networked software for 3Com Corp. Etherseries nets will be offered in the same time frame at $2,000 for the system software plus $395 per node. An expert system development tool, available in the first half of 1986, will cost $20,000 for the system plus $2,000 per workstation, including training and support.

Arity Corp.'s current products include a $495 interpreter, a $1,950 interpreter/compiler and a $19.95 demonstration disk. The tools will run on a 256K-byte IBM Personal Computer, but a 512K-byte configuration with a hard disk drive is recommended. No royalty charges apply to code generated with the compiler.

GOLD from page 11

which used the Prolog tools to build an expert system that consults on installation of its software. Nearly 100 users have benefited from the expert system, which significantly reduces installation time and errors, Gabel said.

Products from Arity customers will begin surfacing next year, Gabel said. "The leaders are out of evaluation mode. . . . Everyone's fighting to get into development mode."

Unlike the case with Gold Hill, Arity will not design its own method to address directly up to 16M bytes on the AT. Instead it will wait for another release of MS-DOS to overcome the direct-address barrier.

Weiss downplayed the value of a networked development environment, saying that the requirement to port between various machines raises unnecessary problems.

EXPERT from page 12

understand expert systems and commissioned a group under Jones to look for ways to apply them.

After two years of looking, his group concluded: "Nobody's written anything in 10 years that's done anything. All the successes that you read about have been around for a long time."

He cited as examples Prospector, an ore-hunting system developed by SRI International, Inc.; and Dendral, a system developed 20 years ago at Stanford University to identify the molecular structure of compounds from samples.

"The reason they were successful is that they mapped a very broad knowledge base of very simple facts," he said.

Human beings tend to lack the computer's capacity to search huge data bases looking for one pattern or set of facts, he noted.

Even when an expert system does this, the rules or knowledge at the core of it tend to be small, he added.

Jones said MIS administrators should continue to look for ways to employ expert systems at their institutions in addition to improving data processing productivity. If expertise were viewed in a broader sense of a collection of experts knowledgeable about more than one aspect of the business, expert systems might be built that could serve long-range needs, he said.

But until then, most financial institutions are finding it cheaper to simply train human experts, he said.

Police recover hijacked DEC VAXs

By Peter Bartolik
CW Staff

WATERTOWN, Mass. — Two top-of-the-line Digital Equipment Corp. systems were recovered in this metropolitan Boston area community Wednesday after being hijacked two days earlier. A contract driver who reported the theft turned himself into police here Thursday after a warrant was issued for his arrest.

The stolen VAX 8600 and VAX-11/785, both fully configured and valued in excess of $1 million, were discovered in a warehouse here after police received calls from two citizens who said they saw DEC packages being unloaded.

The prime suspect in the case, Robert Dickerson, 48, of Malden, Mass., turned himself in to Watertown police midday Thursday after a warrant for his arrest was issued by the Middlesex County District Attorney's office. Dickerson was a driver for Camel Trucking, Inc. of Chelsea, Mass., a company contracted by DEC to transport the equipment to Logan International Airport outside Boston for air shipment to Nihon Digital Equipment Corp., DEC's Japanese subsidiary. DEC spokesman Jeff Gibson said the company has its own trucking fleet, but often contracts out when its own fleet is being fully utilized.

According to police, Dickerson picked up the truck at DEC's Northboro, Mass., shipping facility early Monday afternoon. He told police he pulled into a nearby truck stop on the Massachusetts Turnpike after experiencing mechanical problems. He reportedly was approached by a man with a gun after he got out and lifted up the hood of the truck. Dickerson told investigators he had been pushed into a van, handcuffed and transported to an out-of-the-way area in Wilmington, Mass., some 20 miles away.

The truck, which did not bear any DEC markings, was recovered in Somerville, Mass., Wednesday morning.

Watertown detectives alleged that Dickerson rented the warehouse space for a short period of time some weeks earlier. Watertown Police Sgt. William Chase told *Computerworld* that the circumstances indicated planning on the part of an undetermined number of thieves and that Dickerson certainly knew the contents of the shipment.

Chase said he was not aware of how the thieves intended to dispose of the sophisticated equipment. "There are people who would take a hot stove if the price was right," he said.

John J. Cloherty Jr., a spokesman for the Boston office of the Federal Bureau of Investigation, which joined in the investigation, discounted early media speculation that the equipment was destined for a Soviet bloc country embargoed by the U.S. from receiving such equipment. Cloherty told *Computerworld* the FBI was "treating the case strictly as the theft of an interstate shipment."

DEC's Gibson said he could not conceive of any manner in which the equipment could be disposed of. "If it was a personal computer or a [DEC] Rainbow I could see it, but how do you get rid of a Venus?" he said. Venus was the code name for the 8600 while in the development stage.

'Gray market is huge'

A criminal investigator specializing in industrial security, who asked not to be identified, told *Computerworld* that, "As far as I'm concerned, the gray market is huge and can gobble up anything from a [Cray Research, Inc.] Pentagon-size system to an [Apple Computer, Inc.] Apple, with a VAX someplace in between."

The investigator asserted that Soviet bloc agents "are too sophisticated" to be involved in a case of this type, and, "More likely, it was set up for a domestic buyer."

A company possessing a stolen computer could obtain peripherals, software and services on the gray market or through legitimate non-DEC suppliers, the investigator said. "There have been several cases that I've seen where even banks have ended up with stuff from the gray market only because somebody approached them and said, 'I can get it for you wholesale.' "

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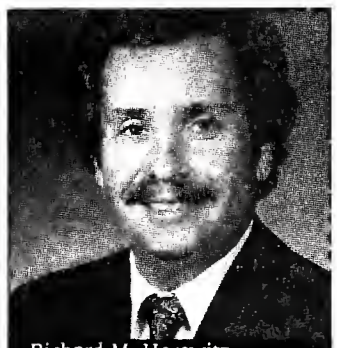
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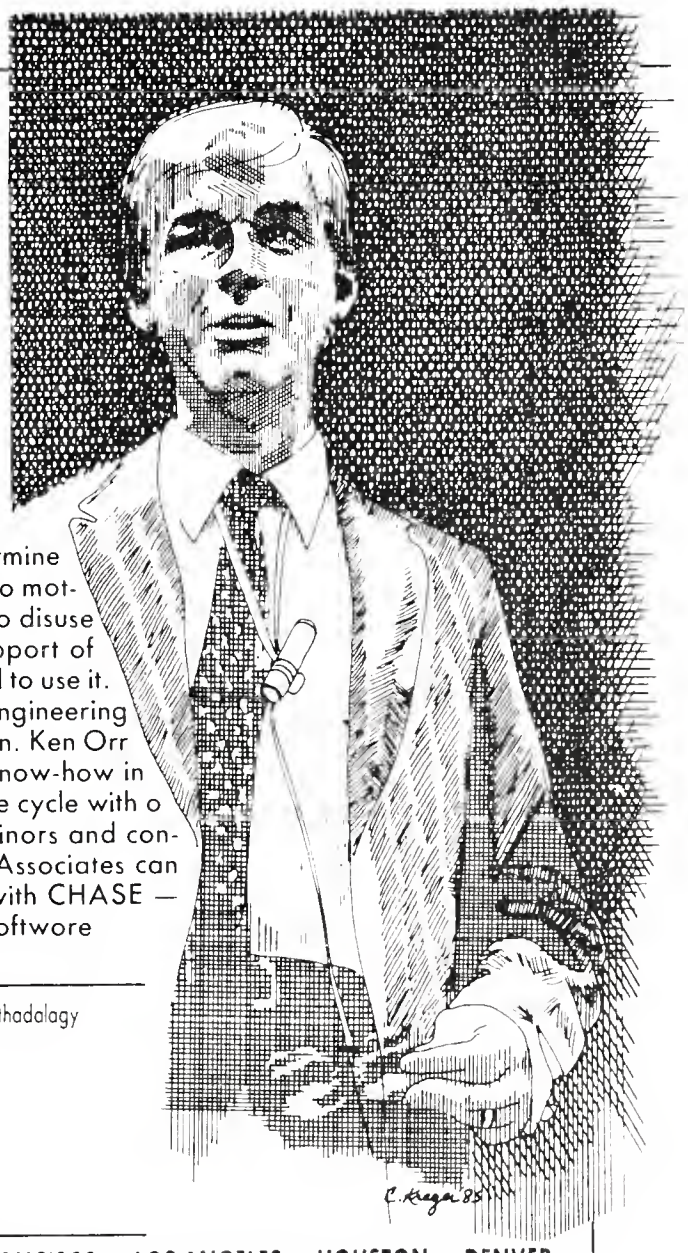

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NEWS

WASHINGTON UPDATE
CW Washington Bureau

DOT plans electronic system for tariffs

WASHINGTON, D.C. — The U.S. Department of Transportation (DOT) recently announced that it plans to develop an electronic filing system for international airline tariffs to replace "an antiquated paper filing and review system that dates back to 1938."

In an advance notice published in the "Federal Register," a daily government bulletin, the DOT said a computerized system would save money for both the airlines and the department, which is faced with an "avalanche" of paper inherited from the defunct Civil Aeronautics Board.

Although the major airlines and tariff filing agents have computerized their tariff data systems, the DOT has not. "As a result, airlines are often in the position of converting computerized fare and rate data into printed form for the sole purpose of meeting the statutory filing requirements," the DOT announcement said.

"The industry is now spending at least $5 million a year to produce, file and distribute paper tariff documents. [The] DOT is spending more than half a million dollars a year just to process the paper," the statement continued.

The DOT said it envisions a system where airlines or their agents would send the data via telecommunications to a central data base. Public comments on the proposal are due Nov. 18.

GSA office markets software, OA services

ARLINGTON, Va. — Tucked away in the U.S. General Services Administration building is an office that acts so much like a private business that it even has a director of marketing to promote its services and distribute slick brochures.

The unit is the Office of Software Development and Information Technology (OIT), which recently held its second annual Client/Vendor Conference here. Much of the conference was devoted to describing the OIT's services to an audience of potential customers — DP professionals at federal agencies.

"We take a business-like approach rather than a bureaucratic approach," commented Rick Dillon, the new OIT director of marketing. The services for government agencies include technical assistance for software management including conversion, maintenance, improvement and quality assurance; developing and managing office automation projects; and systematic planning for information resources management.

The OIT staff is reimbursed for its services by the agency customer, and the goal of the OIT is to produce enough revenue to break even at the end of the fiscal year. Frequently, the OIT helps the agency obtain well-qualified contractors for the job and manages the contract.

Officials were sensitive to criticism from some vendors that the OIT competes with the private sector for government business, a practice that would contradict Reagan administration policy. "We don't compete with the private sector, we create more business for the private sector," Dillon said, explaining that the office is a conduit for vendors seeking agency contracts.

SSA plans Cobol quality control

By Mitch Betts
CW Washington Bureau

ARLINGTON, Va. — The Social Security Administration (SSA), in the midst of its $500-million hardware modernization program, is taking aggressive steps to upgrade the quality of its huge inventory of Cobol software as well, according to Ralph DeAngelus, director of the SSA's Office of Programmatic Systems.

In a recent speech here, DeAngelus outlined several software improvement projects, including the following:

- The SSA held a series of seminars on software improvement for 600 DP professionals.
- The SSA recently ran its Cobol programs through a software alignment tool to standardize alignment. Programmers are now using this tool for new programs, and soon the SSA will not allow a program to migrate to the production library unless it has been run through the alignment tool.
- The SSA initiated a pilot project to acquire and implement a series of integrated tools for upgrading all Cobol software, including tools for converting code to Cobol 74, structuring and testing Cobol code and eliminating dead and obsolete code.

"Our goal is to have a Cobol programmer's workbench installed and in use by the end of next summer," DeAngelus said.

Required to use tools

He added that programmers will be required to use the quality-control tools.

The development and enforcement of quality-control standards is crucial, DeAngelus emphasized. "Without enforcement mechanisms in place, as soon as we started to modify the improved software we would be starting the software degradation process all over again," he explained.

"Once we establish a standard and install a tool to enforce that standard, it will be applied against new software development as well as existing software [maintenance]," he said.

DeAngelus said the agency decided not to have this work done by private contractors. "We need to institutionalize the process in SSA with SSA people.

"We want to avoid another $500-million systems modernization program 20 years from now," he said.

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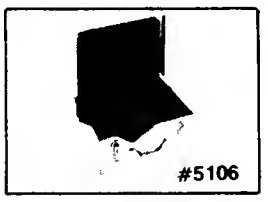

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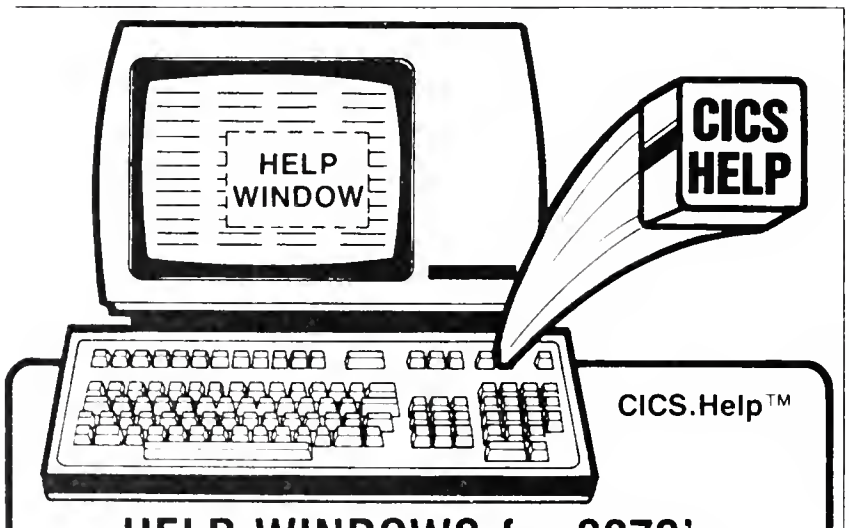

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So we approached Lattice, Inc. and asked if we could implement a version of the Lattice C compiler for IBM mainframes. With Lattice, Inc.'s agreement, development began and progressed rapidly.

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Features of the Lattice C compiler for the 370 include:

- **Generation of reentrant object code.** Reentrancy allows many users to share the same code. Reentrancy is not an easy feature to achieve on the 370, especially if you use non-constant external variables, but we did it.
- **Optimization of the generated code.** We know the 370 instruction set and the various 370 operating environments. We have over 100 staff years of assembler language systems experience on our development team.
- **Generated code executable in both 24-bit and 31-bit addressing modes.** You can run compiled programs above the 16 megabyte line in MVS/XA.
- **Generated code identical for OS and CMS operating systems.** You can move modules between MVS and CMS without even recompiling.
- **Complete libraries.** We have implemented all the library routines described by Kernighan and Ritchie (the informal C standard), and all the library routines supported by Lattice (except operating system dependent routines), plus extensions for dealing with 370 operating environments directly. Especially significant is our byte-addressable Unix®-style I/O access method.
- **Built-in functions.** Many of the traditional string handling functions are available as built-in functions, generating in-line machine code rather than function calls. Your call to move a string can result in just one MVC instruction rather than a function call and a loop.

In addition to mainframe software development, you can also use our new cross-compiler to develop PC software on your IBM mainframe. With our cross-compiler, you can compile Lattice C programs on your mainframe and generate object code ready to download to your PC.

With the cross-compiler, we also offer PLINK86™ and PLIB86™ by Phoenix Software Associates Ltd. The Phoenix link-editor and library management facility can bind several compiled programs on the mainframe and download immediately executable modules to your PC.

Tomorrow...

We believe that the C language offers the SAS System the path to true portability and maintainability. And we believe that other companies will make similar strategic decisions about C. Already, C is taught in most college computer science curriculums, and is replacing older languages in many. And almost every computer introduced to the market now has a C compiler.

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NEWS

WORLD DIGEST

CW International News Network

TOKYO — Hitachi Ltd. has announced that it received orders for its Model S-810 supercomputer from the Meteorological Agency and Okazaki Kokuritsu Kyodou Kenkyu Kikou Bunshi Kagaku Laboratory, which is a national Japanese molecular research laboratory.

Increased use of supercomputers is evident this year, and the Japanese market is becoming more competitive among Fujitsu Ltd., Hitachi, NEC Corp. and Cray Research Corp.

Hitachi only shipped its first supercomputer in October to Tokyo University. Since then, six of the company's supercomputers have been ordered for installation in Japan.

DAQING, China — The Ministry of Petroleum here has recently ordered five Control Data Corp. Cyber 180 computer systems and supporting software. The systems will be used for reservoir simulation, computer-aided design and manufacturing surface construction and oil field management in Zhongyuan, China, and Daqing, where more than half of China's petroleum is produced.

Included in the sale is CDC's Geomaster software program for petroleum exploration and seismic data processing. The new systems are valued at $30 million and are scheduled to be installed by December, according to CDC.

SYDNEY, Australia — A $6 million order for point-of-sale equipment has been placed by Burns Philp and Co. in an initial move to link 71 stores here. The contract called for the Handi 25 system from ICL Australia Pty. Ltd. The system consists of Handi 25 systems with 320K bytes of memory and 130M bytes of disk storage. Each store will link about four cash registers and two office systems. ICL pricing printers and standard printers will also be installed.

TOKYO — AT&T Unix Pacific Co., a subsidiary of AT&T of the U.S., has recently signed an agreement here with Nippon Unisoft to develop bilingual capability on AT&T's Unix System V operating system. The product would enable Japanese users to interface with Unix System V, using either Roman characters or Kata-Kana, a phonetic alphabet commonly used in Japan.

The software will be developed in Japan on AT&T 3B2/400 supermicrocomputers and will be made available with Japanese documentation. Plans are under way to license the software worldwide on AT&T's 3B computer line through Japanese distributors.

SYDNEY, Australia — International Data Base Management Association (IDBMA) and *Computerworld Australia* have announced an agreement whereby *Computerworld* will represent IDBMA's computer-based "Pick Spectrum" trade shows in Hong Kong, Singapore and Japan. *Computerworld Australia* is the Sydney-based sister publication of *Computerworld* of the U.S. Show dates have not been set, but it is expected that the first will be held in Hong Kong in 1986.

BIRMINGHAM, England — Applied Computer Techniques Ltd., maker of the Apricot microcomputer, revealed financial results for the 1984 fiscal year: pretax profits increased 129%, from $6.6 million in 1983 to $12.9 million in 1984. During that period, sales rose 82%. Insiders said exports were up, and production on the Apricot has increased from 4,500 to 6,500 systems per month.

CALENDAR

WEEK OF SEPT. 29

SEPTEMBER 29-OCTOBER 2, CHICAGO — **American Bankers Association (ABA) National Bank Card Conference.** Contact: ABA, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

SEPTEMBER 30-OCTOBER 1, CHICAGO — **Financial Futures, Options and Swaps.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

SEPTEMBER 30-OCTOBER 1, NEW YORK — **Sixth Annual Computer Law Institute.** Contact: Law & Business, Inc., Harcourt Brace Jovanovich Publishers, 855 Valley Road, Clifton, N.J. 07013.

SEPTEMBER 30-OCTOBER 2, BOSTON — **Index '85.** Contact: Independent Expositions, Inc., 786 Rockrimmon Road, Stamford, Conn. 06903.

SEPTEMBER 30-OCTOBER 2, BOSTON — **Information Systems Architecture.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

SEPTEMBER 30-OCTOBER 2, NEW YORK — **Comlease — The Computer Leasing Conference and Exposition.** Contact: Comlease, 3825-1 S. George Mason Drive, Falls Church, Va. 22041.

SEPTEMBER 30-OCTOBER 3, WASHINGTON, D.C. — **The Fifth Annual Conference on Control, Audit and Security of IBM Systems.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

SEPTEMBER 30-OCTOBER 3, WASHINGTON, D.C. — **Using Microcomputers in Government.** Contact: U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903

SEPTEMBER 30-OCTOBER 4, HOUSTON — **Structured Analysis & Design Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop West, Houston, Texas 77092.

SEPTEMBER 30-OCTOBER 4, WASHINGTON, D.C. — **Computer Capacity Planning.** Contact: Compumetrics Training Institute, P.O. Box 58383, Houston, Texas 77258.

OCTOBER 1, DALLAS — **T-1 Carrier Strategies.** Contact: The DMW Group, Inc., Seminar Division, 2020 Hogback Road, Ann Arbor, Mich. 48104. Also being held Oct. 2 in Washington, D.C., Nov. 12 in New York, Nov. 20 in Boston and Dec. 3 in Los Angeles.

OCTOBER 1-3, NEW YORK — **Data Base: A Manager's Guide.** Contact: Technology Transfer Institute, 741 Tenth Ave., Santa Monica, Calif. 90402. Also being held Oct. 15-17 in Washington, D.C.

OCTOBER 1-4, LOS ANGELES — **CICS Application Design.** Contact: Sys-Ed, Computer Education Techniques, Inc., 35 W. 35th St., New York, N.Y. 10001.

OCTOBER 2-4, BOSTON — **Developing Careers: Issues for Engineers and Employers.** Contact: Institute of Electrical and Electronics Engineers, Inc., Suite 608, 1111 19th St. N.W., Washington, D.C. 20036.

OCTOBER 2-4, BOSTON — **User Workshop.** Contact: Judy Trelogan, Arthur Young & Co., 1950 Roland Clarke Place, Reston, Va. 22091.

OCTOBER 2-4, NEW ORLEANS — **Intelligent Buildings Conference and Exposition.** Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

OCTOBER 2-4, TOKYO — **Japanese Computer Software: Management, Quality, Productivity, Strategy and Market.** Contact: Hideaki Hashizume, Technology Transfer Institute, Suite 1411, One Penn Plaza, 250 W. 34th St., New York, N.Y. 10119.

OCTOBER 3-4, ST. LOUIS — **Federal ADP and Telecommunications Procurement.** Contact: International Data Corp., Washington Division, Suite 240, 1500 Planning Research Drive, McLean, Va. 22102. Also being held Oct. 17-18 in Denver, Oct. 31 to Nov. 1 in San Antonio and Nov. 14-15 in McLean, Va.

OCTOBER 3-4, SAN ANTONIO — **Southwest Computer Measurement Group Fall Meeting.** Contact: Ellen Robertson, Texas Utilities Services, Inc., 2001 Bryan Tower, Dallas, Texas 75201.

OCTOBER 3-4, SEATTLE — **Rapid Prototyping Workshop.** Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

WEEK OF OCTOBER 6

OCTOBER 6-8, SAN FRANCISCO — **Solid Modeling '85: Making CAD/CAM Pay Back.** Contact: Jacquelin Cooper, "CAD/CIM Alert," 824 Boylston St., Chestnut Hill, Mass. 02167.

OCTOBER 7-9, NEW YORK — **VM for Systems Programmers.** Contact: Sys-Ed, Computer Education Techniques, Inc., 35 W. 35th St., New York, N.Y. 10001.

OCTOBER 7-10, LOS ANGELES — **CICS Command-Level Programming.** Contact: Sys-Ed, Computer Education Techniques, Inc., 35 W. 35th St., New York, N.Y. 10001.

OCTOBER 7-11, BELLEVUE, WASH. — **C Programming Workshop.** Contact: David Cheyette, Specialized Systems Consultants, P.O. Box 7, Northgate Station, Seattle, Wash. 98125.

OCTOBER 7-11, KING OF PRUSSIA, PA. — **CICS/VS Command-Level Programming.** Contact: Ned Frey, Computer Assistance, Inc., Suite 480, 1150 First Ave., King of Prussia, Pa. 19406.

OCTOBER 7-11, LOS ANGELES — **Basic Systems Analysis.** Contact: Thomas J. Bisacquino, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held Oct. 7-11 in Calgary, Alta.

OCTOBER 7-11, LOS ANGELES — **Data Base Development Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop West, Houston, Texas 77092.

OCTOBER 7-11, NEW YORK — **CICS Macro-Level Programming.** Contact: Sys-Ed, Computer Education Techniques, Inc., 35 W. 35th St., New York, N.Y. 10001.

OCTOBER 8-9, MINNEAPOLIS — **Tenth Conference on Local Computer Networks.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

OCTOBER 8-10, TOPEKA, KAN. — **DSSD Users' Conference — Feedback '85.** Contact: Ken Orr & Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

OCTOBER 8-12, NANJING — **Autoinfo China '85.** Contact: American Export Group International Services, Inc., Watergate 2600, 2600 Virginia Ave. N.W., Washington, D.C. 20037.

OCTOBER 9-10, CHICAGO — **The Financial Supermarket: New Fee Income Opportunities for Banks & Thrifts.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

OCTOBER 10, NEW YORK — **Vtam Operations Workshop.** Contact: Sys-Ed, Computer Education Techniques, Inc., 35 W. 35th St., New York, N.Y. 10001.

WEEK OF OCTOBER 13

OCTOBER 13-16, WASHINGTON, D.C. — **Information Science Inc.'s 16th International Users Conference on Human Resource Management.** Contact: Information Science, Inc., 95 Chestnut Ridge Road, Montvale, N.J. 07645.

OCTOBER 14-15, SAN FRANCISCO — **Direct Response Marketing for Financial Institutions: Telemarketing, Direct Mail & Sales Training.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925. Also being held October 21-22 in Los Angeles.

OCTOBER 14-16, PHILADELPHIA — **Managing Application Software Support Workshop.** Contact: Infosci Inc., Box 7117, Menlo Park, Calif. 94026.

OCTOBER 14-17, NEW YORK — **Info '85 — Information Management Exposition & Conference.** Contact: Cahners Exposition Group, Client Services, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

OCTOBER 14-18, BOSTON — **Management Workshop.** Contact: Judy Trelogan, Arthur Young & Co. 1950 Roland Clarke Place, Reston, Va. 22091.

OCTOBER 14-18, NEW YORK — **Structured Systems Analysis Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop West, Houston, Texas 77092.

OCTOBER 15, CHICAGO — **Transacting Business Electronically: Insights Into a Rapidly Changing Field.** Contact: Chi/Cor Information Management, Inc., 10 Riverside Plaza, Chicago, Ill. 60606.

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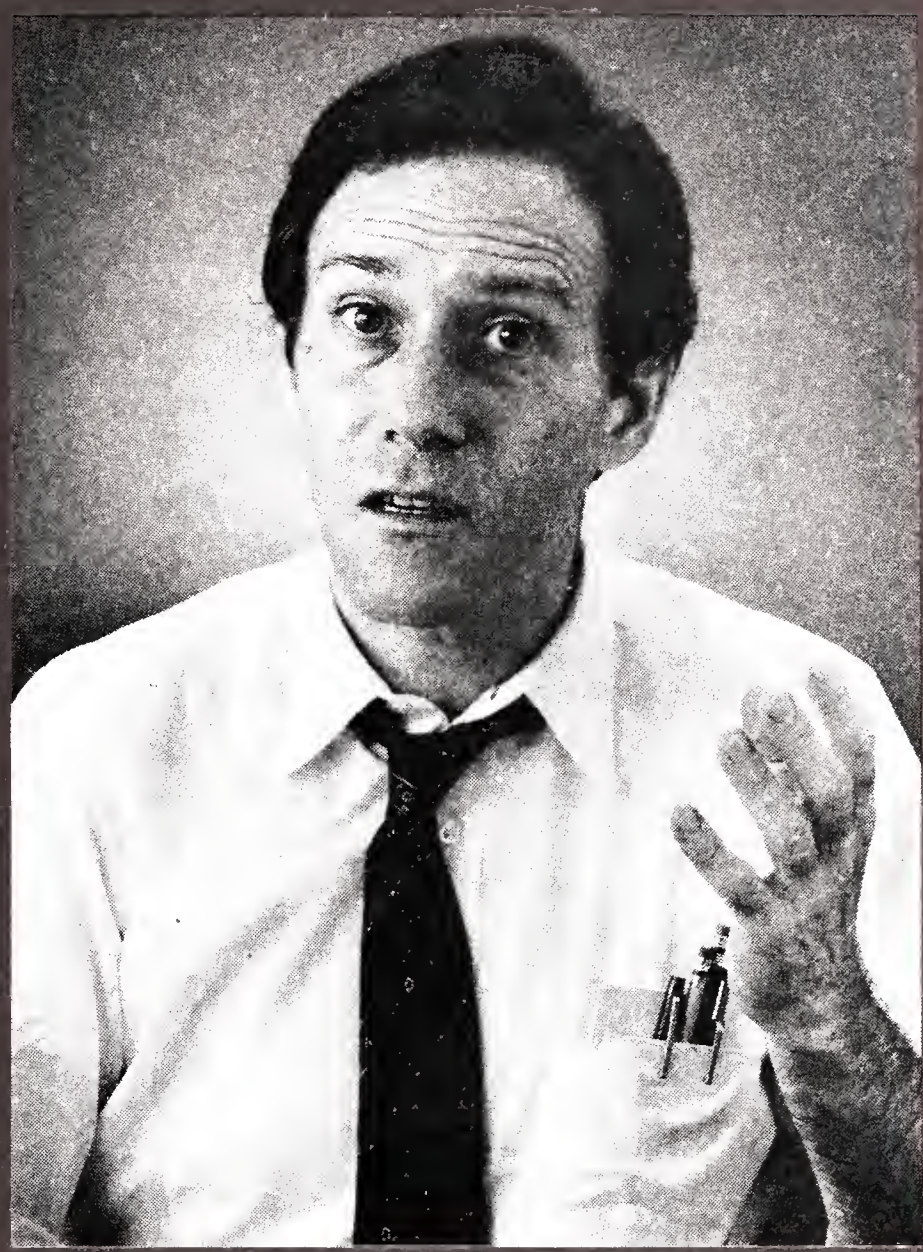

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- **VMSCHEDULE,** a workload scheduling system that allows tasks to be scheduled to run unattended at predetermined times.
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- **VMARCHIVE,** an end-user archival storage system.
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AGENDA

8:30	Coffee and Registration
9:00	Seven Keys to Control
10:15	Break
10:30	Taking Charge of Your Data Center
12:00 noon	Complimentary Lunch
1:00-4:00	User Workshop (non-users welcome as well!)

SEMINAR DATES AND LOCATIONS

Boston, MA	Oct. 18
Chicago, IL	Oct. 23
Columbus, OH	Sept. 18
Dallas, TX	Oct. 7
Detroit, MI	Oct. 16
Houston, TX	Oct. 8
Los Angeles, CA	Sept. 24
Milwaukee, WI	Oct. 10
New York, NY	Oct. 3
Orlando, FL	Oct. 21
Philadelphia, PA	Sept. 30
Pittsburgh, PA	Oct. 29
St. Louis, MO	Oct. 7
San Diego, CA	Sept. 23
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EDITORIAL

Artificial? Or intelligent?

One of those magical moments that we all eagerly await in the diurnal continuum of modern technology is the point at which a buzzword becomes a reality. So it is that we watch the steady progress of the concept of artificial intelligence, so far a buzzword, soon . . .

Artificial intelligence, or AI as buzzword users worth their salt refer to it, was last year's hot button, a subject that flitted through the ether and caught the fancy of technical users and the public alike — especially the public, and especially that segment of it that works for media similar to, uhm, *this* one. People dearly wanted to believe that all of their *2001* fantasies could come true and that machines could be made to think and act like humans and to relieve humanity of whatever odious routine it cared to slough off. And certain quarters of the computer industry, seeing boom times turn disturbingly bust-like, were not averse to holding out the promise of hardware and software that could — and *would* — do just that, in just a matter of months.

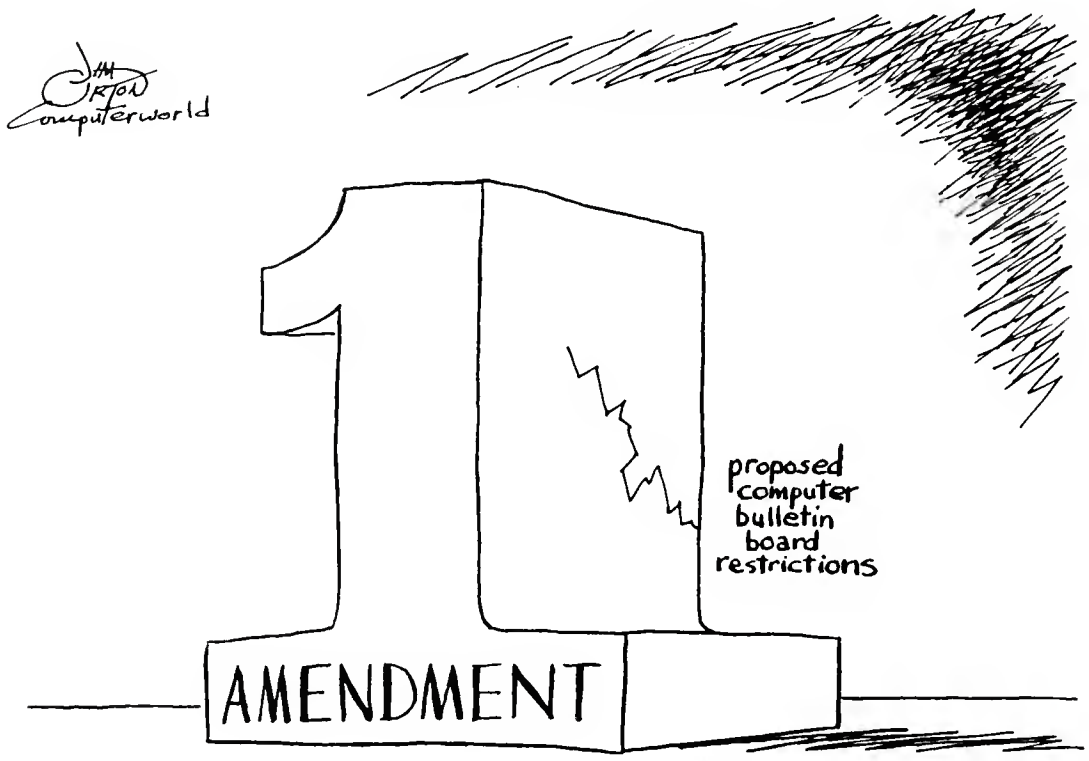
Too much was said, and written, too soon. The reality is that artificial intelligence will always be whatever new computer technology is down the road, just out of reach, barely in sight. Twenty years ago, for example, spelling checkers were considered artificial intelligence. Ten years ago, icon-based interfaces were exotic stuff. What *is* important is that users, and the media, sort through the welter of AI-type developments at any given time and focus attention on those that seem most promising in terms of use and practicality.

Sorting through these developments, some key highlights are the dramatic price/performance improvements in dedicated AI workstations, moves toward language standards and the emergence of better links to traditional computer functions. The most tangible near-term developments likely to emerge from this activity, the ones that will appear to move computer applications forward most dramatically, are expert systems: software tools that draw upon human experience to expedite certain sophisticated, yet routine, job functions.

Users have a great interest in — and, more important, a genuine need for — expert system programs to capture the expertise of retiring professionals, to compensate for talent shortages and to help meet emergency production situations. Such systems also could improve business efficiency as friendly front ends to corporate data bases and as spreadsheet templates. Expert systems fill a critical need, and vendor concentration of development tools for business use is to be applauded.

Demand for these products, however, must come from the corporate users. DP staffs can't, of course, turn their attention away from their critical day-to-day functions to focus exclusively on new AI technology, however intriguing that may be. But DP executives do need to keep a close eye on the technology, which promises tremendous payoffs somewhere down the road.

The road will be a long one. As AI gurus often note, in many ways AI can be viewed as a weak technology, often very difficult to apply to problems that seem fairly straightforward. For many systems, successful commercial implementation will take years of work. But at the end of that long road, DP must be there to help merge the new systems into the corporation's overall information management structure. Managers can begin today, by investigating the products that are available or under development, by steering clear of the buzzwords and nurturing the reality.



LETTERS

Smart building research misleading

In reference to the article, "Demand low for smart buildings" [CW, June 17], it is always interesting to read market research reports. You often wonder if they want a particular answer before they start or whether they asked the wrong question. In this case, they asked the wrong question.

When many people are asked about the need for computers, they answer negatively. Does that mean that the demand for computers is low? Quite the contrary. Asking tenants and developers if they want shared services is like asking people if they want shared bathrooms or shared socks. The answer is obvious.

However, if you ask if tenants want their telecommunications systems to be capable of growing from a few lines to thousands, if they want little capital expense, enhanced services, better training and telecommunications management support, on-site technical maintenance and better control of long-distance calls, the answer is an overwhelming "yes." If you ask developers if they want better leasability, revenue potential and lower operating costs, they also answer "yes."

The bottom line is that these technologically enhanced buildings are here. In fact, the question is not if or when but how fast. Currently, professionally managed and marketed intelligent buildings are achieving 90% leasability in high-vacancy markets. This reflects the true definition of an intelligent building — one that is fully leased.

Thomas B. Cross
Boulder, Colo.

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VIEWPOINT

For every slump, there's a silver lining

WOHL STREET MINIJOURNAL
Amy Wohl

Everyone knows the computer industry is in a slump. Each day brings more bad news. The biggest and the best report that profits are down. The telephone industry boys who were all set to challenge IBM for the information systems vendor crown cut 24,000 staff positions.

Everyone blames the slump for everything. Customers don't buy your products? Blame the slump and not your development department's failure to predict market requirements. Market share changes? Blame the slump (I thought we were all in the same market). Products slip their schedules? Blame the slump (Why?). Can't get venture capital? Blame the slump and not the fact that your bright idea or the management team you propose to run with it aren't worth investing in.

Boring. You're tired of reading articles like that about the computer slump, and I'm tired of writing them. Isn't there something more creative to do?

It was refreshing to meet an old friend, a seasoned computer industry professional who is currently heading a major minicomputer company. He suggested that slumps are really excellent business opportunities for those who know how to take advantage of them. "We get fat and happy and a little careless when things are going well," he said, "and it's darned hard to fix that when you're making lots of money."

But how do you take advantage of a slump? "Well," he continued, "it's a great opportunity to get rid of people and projects you never should have taken on in the first place." No need to say anything unpleasant; just blame it on the slump.

Fascinated, I asked him to continue. He described his current plan of action:

- Get rid of anything that isn't making money now and probably won't any time soon. Look particularly for projects that were started as someone's pet, projects that have a huge staff and no results and projects that are significantly behind schedule and may no longer be in their marketing window when and if a product ever emerges.
- Don't start projects that don't make economic sense. Look at projects that are someone's pet, projects that need big budgets and projects that don't seem to have a strong basis in customer needs or a strong fit with what your firm does best. The slump and your firm's need to husband any existing surplus will be an adequate, impersonal explanation of your inability to approve the project.
- Use the slump as a way of revitalizing your employees. Change them back into the lean, mean and successful team that started your company. Everyone can understand the importance of team effort and working hard when times are tough.

By using a slump creatively, you can come out of the slump at top speed, ready to take advantage of the business growth that will surely follow.

Note that a significant feature of this slump is the number of computer companies now in the industry, and adversely affected by the slump, that haven't lived through this problem before. Maybe they managed to escape the last computer industry downturn, or maybe they're so young that they've never lived through one before. If you've known only good times, you can't be experienced in wise behavior for the bad times. So a great deal of the howling and screaming is simply because of inexperience.

Experienced companies are following my friend's example:

- Cut back as soon as you recognize the need to. Don't wait; it will only make things worse.
- Make the initial cutbacks bigger than you think you'll need. No one will ultimately remember that you cut the work force by 18% instead of 16%, but everyone will remember that you had two layoffs instead of one. You can always announce that you're rehiring — that's good news.
- Get rid of all the deadwood. You won't have another chance. If you fail to do so, it may mortally wound your company; if you fail to do so and live through the slump anyway, you'll never get rid of deadwood when things are going well.
- Make everyone share the burden. You can't ask the administrative staff to work extra hard and count the paper clips while you continue to call for management meetings in Hawaii.
- Don't cut back on the very things that will build your future. Try to hold on to the money for research and development, product planning and management and anything that supports your customer relationships, such as service, support, users groups and market research.

And how should a user organization make hay during bad times? By using the downturn as a filter, measuring how its current or prospective vendors behave. If they act like grown-ups, clean up their mistakes and look to the future rather than crying about the past, you'll like them; if not, you will have learned something useful. It is also a good test of their financial viability: Good vendors should have a backlog and some contingency plans to get them through bad times.

Of course, user organizations will want to see exactly what vendors are chopping off. It might just be the very product you were interested in, in which case you may need to change vendor plans.

And you'll want to take advantage of bargains. Vendors that are trying to build a better bottom line for the current quarter turn into real deal makers. Users should be able to get better discounts, additional support or better guarantees and better information about future plans. Vendors really need users in a downturn — sometimes they forget this when times are good. This is the users' turn to get what they want and need. Caution: Do remember that if you cut deals too sharply, you will simply contribute to the nonprofitability of your vendor — and nonprofitable vendors become nonvendors.

So consider the computer slump to be a hidden opportunity for vendors, a chance to get things in hand, a time to keep what's good, to throw out what's not and to prepare for a bright future. For users, it's a golden opportunity to measure the vendors' mettle, to look for new relationships on terms you select and to get an occasional bargain from a temporarily distressed, but sound, supplier.

Who said dark clouds don't have silver linings?

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of the "The Wohl Report on End-User Computing" newsletter.

Pitting U.S. hackers against Japanese technology

READER'S PLATFORM
Jon R. David

The economy of this country is being severely strained by a large and ever-growing negative balance of trade. Recent figures gave an imbalance of minus $7 billion last year in the electronics industry. When I see how many of my own purchases of TVs, hi-fi systems, videocassette recorders and the like are Japanese, I wonder how long it will be before Japan is the major computer force in the world.

If the Japanese computer industry offers products that are equivalent in price and quality to Japanese electronics equipment, how can the U.S. computer industry remain the international leader?

Although it seems we cannot compete with Japanese manufacturing, the same writings that laud Japanese production point out that the Japanese do not create, they very efficiently copy, and programming is truly creative.

Some of us are not particularly adept at programming. Others, however, are naturals at this contemporary art form; their achievements are astounding, and their potential is beyond comprehension. Some of these gifted few are known as hackers and are stirring up quite a bit of trouble and attention.

These troublemakers fool around with supposedly secure data bases, use computer and telecommunications resources of public and private businesses and services without paying for them and the like. Although there are very few reports of any actual damage being done, the horror of what these hackers might do has inspired legislative acts directed against hackers, typically making their actions criminal.

Now, although I really don't want some teenager messing around with my bank accounts, I recognize the talent and ability requisite for doing so. Not only do I admire that talent, I want to put it to use, for me, not [inadvertently] against me. Moreover, I think that hackers show the creativity that will enable U.S. computer systems to maintain our country's position as world leader in the computer industry. We have to find these unique talents and get them working for us.

Seek out hackers

Over the years I've worked with a few of these computer freaks. Most of them best like interacting and working with others of their ilk. Rather than shutting down these gifted individuals or putting them into hiding, we should seek them out and get them working together on things that are worthwhile. This, however, is not the easiest thing to do.

Possibly the best way to do this would be to create test systems, networks, data bases and the like. These, created by government agencies, computer manufacturers or whomever, would contain the most sophisticated security devices available. As part of a national test, awards could be given as higher levels of security are breached. These awards could be financial but could also be months of free computer use, a certificate or a plaque.

Additional awards could be given to security breachers who can come up with better security at the levels they breach. The important thing is to give these people a challenge in an environment in which they cannot cause damage to exhibit the talents our industry so sorely needs. Once we identify them, the problem becomes one of harnessing all that ability.

Next, we need a work methodology to keep these people happy and productive. How we do it doesn't matter and will vary greatly, depending on the individual and the situation, but the important thing is to keep these people interested and productive.

Rather than legislating away these hackers, we must recognize their abilities and potential and direct our attention to fostering them and getting them to work in ways to maintain our creative edge in the computer industry. Since we can't seem to compete in equipment manufacturing, these people are the best hope of the U.S. computer industry.

David is a telecommunications consultant based in Tappan, N.Y.

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	Activity	Duration	Tail	Head	Target
1	Drill Well	4	1	2	.
2	Build Pump House	3	2	5	.
3	Install Pipe	2	5	7	10jul85
4	Construct Power Line	3	1	5	07jul85
5	Excavate	5	1	4	09jul85
6	Install Pump	6	4	7	.
7	Deliver Material	2	1	3	.
8	Assemble Tank	4	3	6	.
9	Erect Tower	6	6	7	.
10	Pour Foundation	4			
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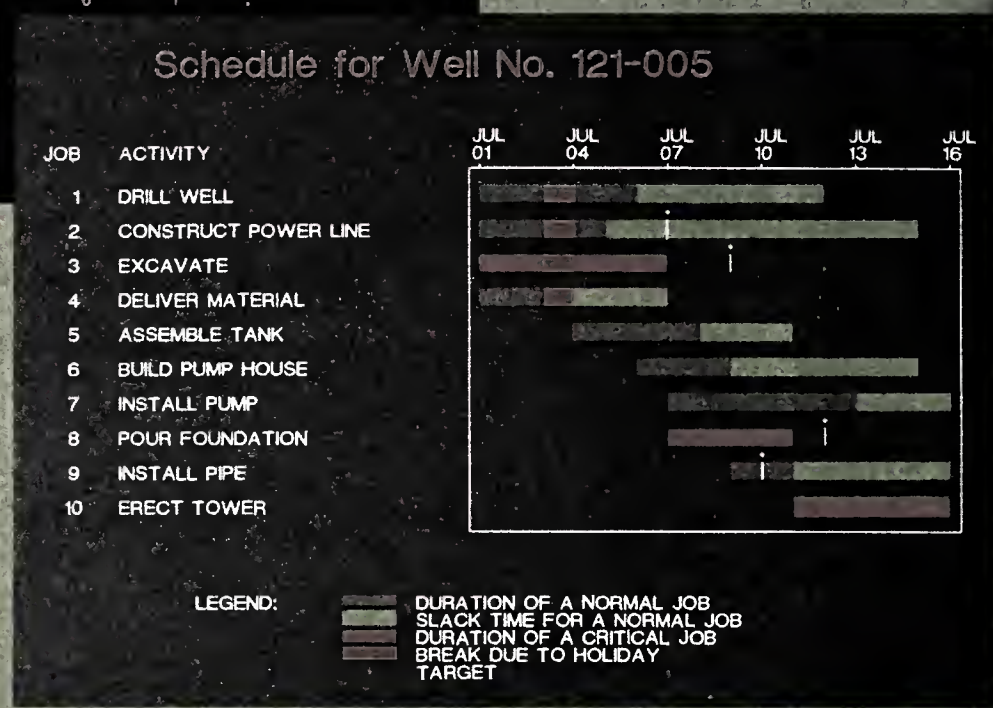

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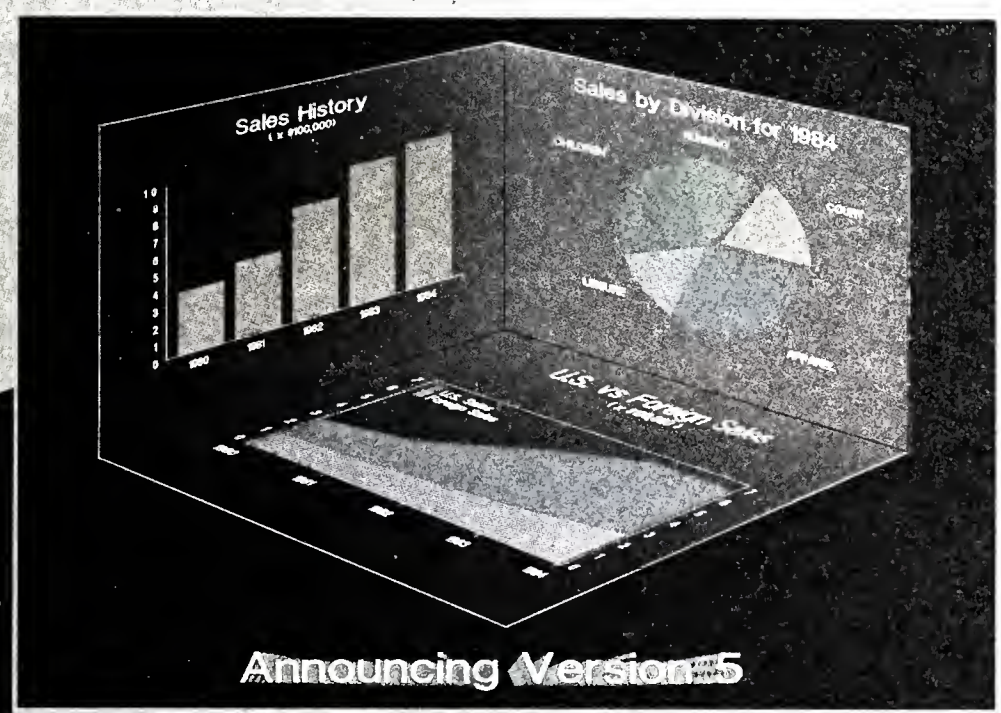

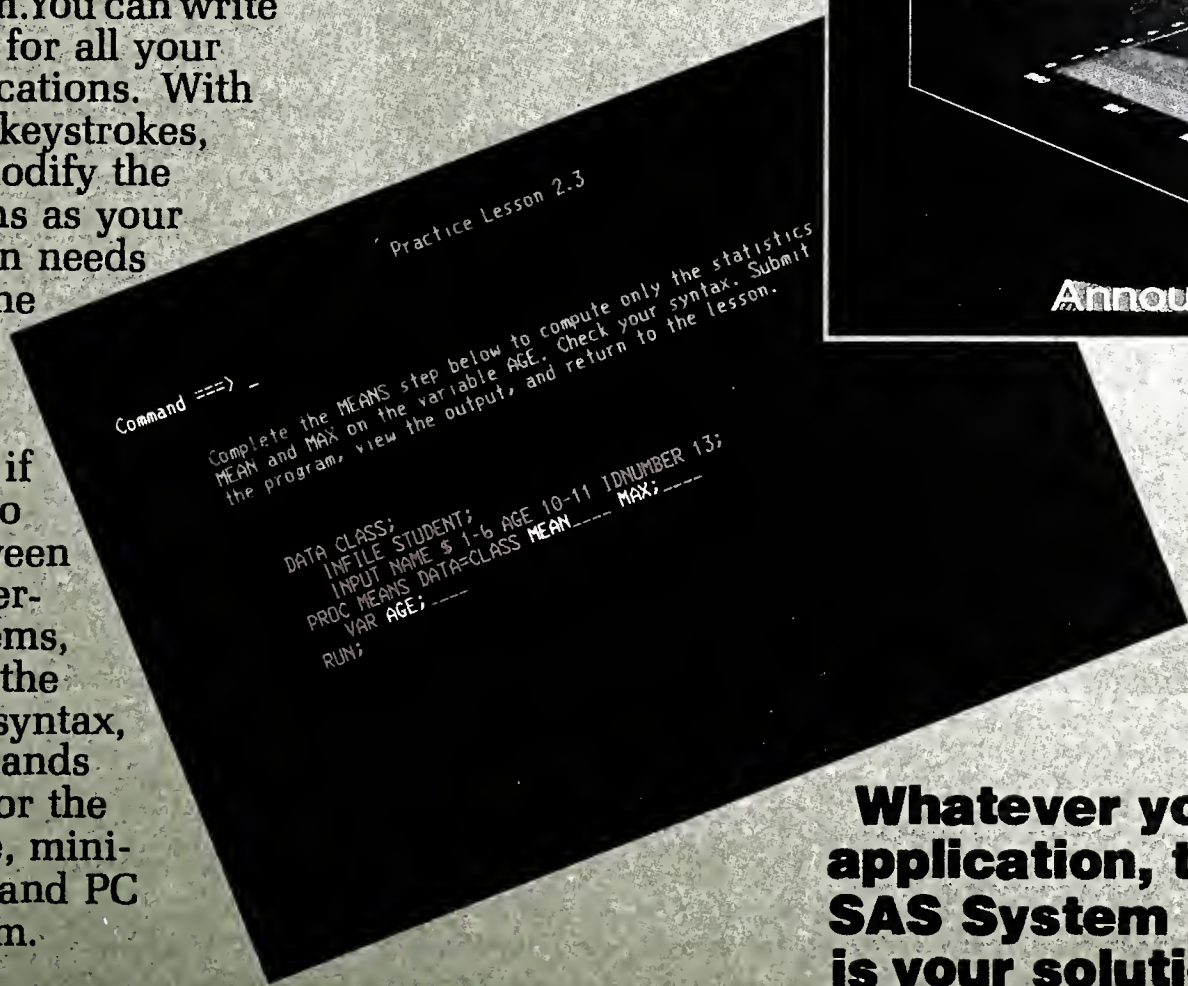

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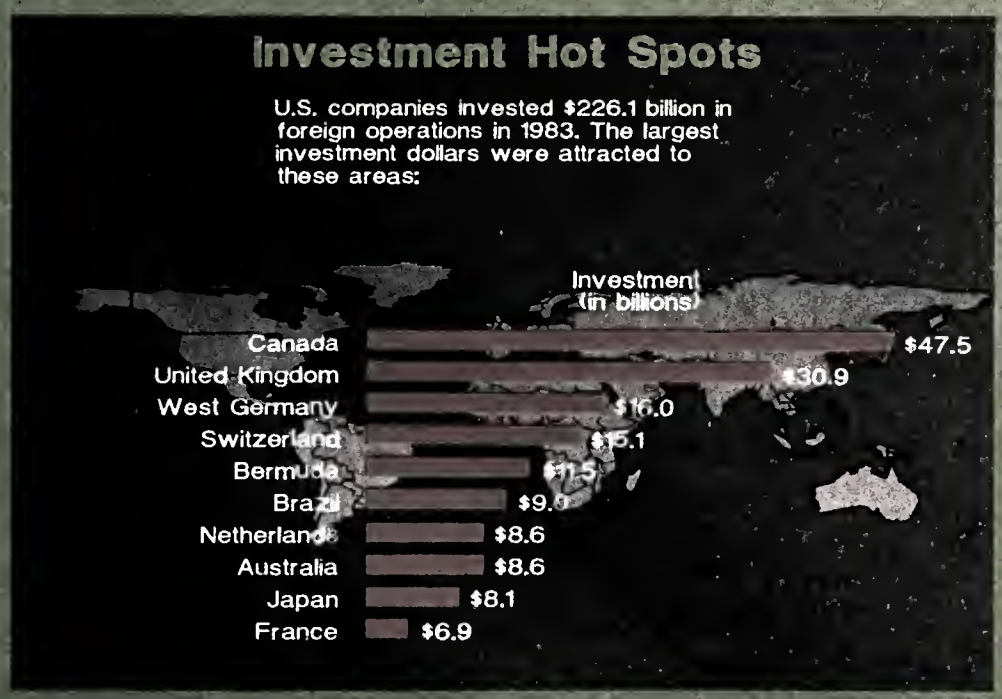

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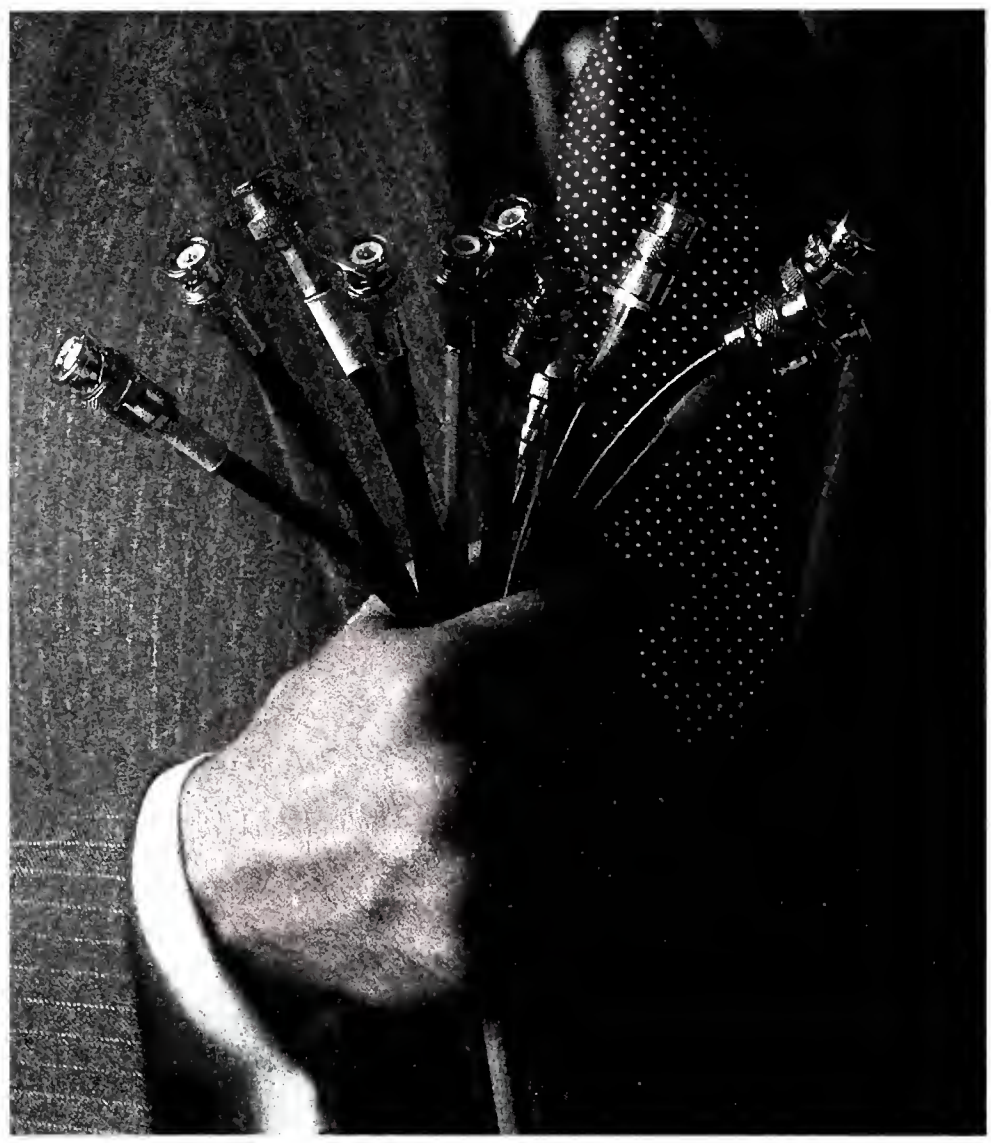

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Hardware Roundup

By Ed Warner CW Staff

A look at 91 systems from 14 vendors

As technology blurs the old definitions, a major change from previous years is evident in this year's *Computerworld* Hardware Roundup of small systems.

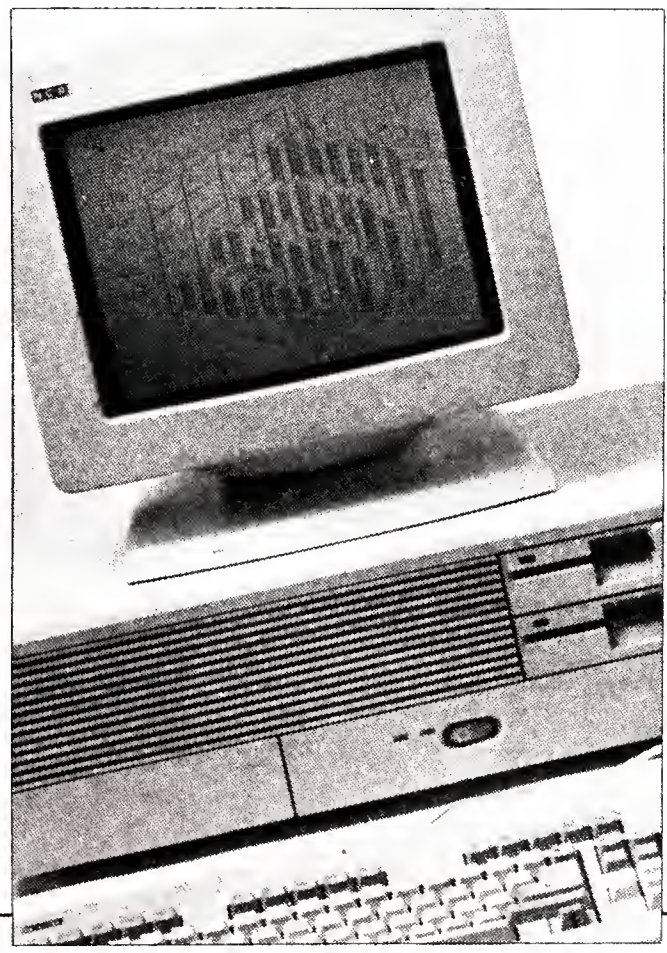
Along with personal computers, 16-bit minicomputers have been included this year, both because the majority of minicomputers have incorporated 32-bit processors and because, at the other end of the spectrum, personal computers are exhibiting processing power and multiuser capability that once only minis could provide.

Other changes taking place in the computer industry are reflected in this week's roundup of 91 systems from 14 vendors. Most notably, fewer vendors of either type of machine are in the listing — yet the listing has grown larger. This reflects the shakeout occurring in the industry.

While many of the vendors who didn't make this year's list are still in business, their presence has diminished relative to the major players, according to market analysts. This is particularly true in the large-corporation market for personal computers. Many vendors are redirecting their pitch to small businesses or other market niches.

Overall, however, the number of models shown has grown about 20%, because the major personal computer vendors are keeping their older products alive while debuting new ones.

Vendors such as Zenith Data Systems Corp. apparently have taken a lesson from the Big Three automakers, offering a variety of models designed to fit every need, from high-speed processing to portability. Zenith's entries in the personal computer market now include a laptop portable, a "luggable" portable, an entry-level desktop computer and a high-performance model based on the Intel Corp. 80286 microprocessor — all introduced in the 12 months since the last Hardware Roundup was published.



> *While diversity has come to mark the personal computer market, one touchstone has remained — IBM compatibility. The IBM-compatible Microsoft Corp. MS-DOS operating system is the one most often supported by non-IBM hardware.*

This emphasis on product diversity reflects the maturity coming to the personal computer market. As in the early days of the U.S. auto industry, a consolidation of manufacturers has taken place, but products remain diverse. Now, though, those products come from under one roof, which bodes well for the user who wants the support of a vendor that will still be in business in years to come.

While diversity has come to mark the personal computer market, one touchstone has remained — IBM compatibility. A quick overview of this year's roundup reveals the predominance of the IBM-compatible Microsoft Corp. MS-DOS operating system as the operating system most often supported by the non-IBM hardware.

An equally impressive bow to the IBM world comes from the 16-bit minicomputer side of the roundup, where about a half-dozen more machines have included Systems Network Architecture support among their communications protocols.

A problem, however, has come to dog the 16-bit mini — newer, more sophisticated software will only run on 32-bit machines. The 16-bit processors simply can't handle the volume of code quickly enough. For that reason, market analysts now predict the coming sunset of the 16-bit mini, caught, like the 8-bit personal computer, between the increasing inexpensiveness of more powerful hardware and the growing sophistication of software.

Another change from last year that has affected both minicomputer and personal computer purchasers is just how much more computer a dollar buys. In one example, an IBM Personal Computer model selling for more than $4,000 when it was introduced four years ago now can be acquired for about $2,200.

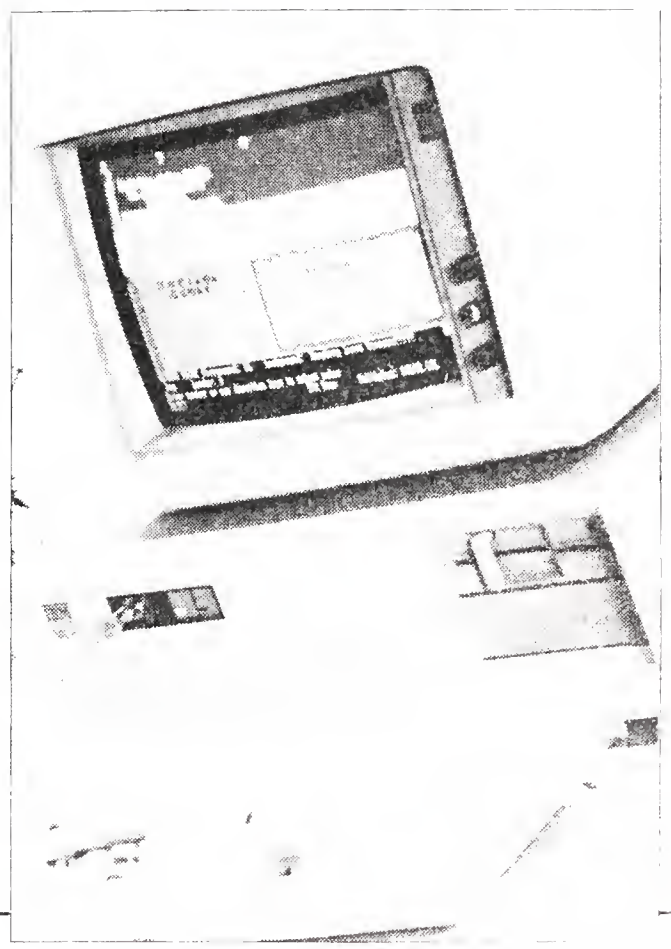
When last year's Hardware Roundup was published, the only entry from a major vendor running the Intel 80286 was the IBM Personal Computer AT, a machine then only a month old. Now nearly every major non-IBM personal computer vendor has an 80286-based machine, with Compaq Computer Corp. offering not one but two portable versions.

Another sign of greater sophistication in the personal computer arena is not evident from the charts, though. That is the increasing number of personal computers that incorporate a hard-disk storage unit.

And, where a Winchester disk of 10M bytes — as in the IBM Personal Computer XT — was once a thing to marvel at, most of the new hard disks provide 20M bytes or more.

Though the distinction between the personal computer and the 16-bit mini has become blurred, the mini still supports multiple users at a relatively low cost and will be with us for some time to come.

The Hardware Roundup is intended only to be a sampling of offerings on the market. The listings are not intended to be either a buyer's guide or an endorsement of any product.



HARDWARE ROUNDUP

Microcomputers and minicomputers

Texas Instruments, Inc.

Characteristics / System	Pro-Lite	Portable Professional	Professional	Business-Pro	Business System 300	Business System 600	Business System 800
Address Space	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit
Communications Protocols	Synchronous, asynchronous, SDLC[1]	Synchronous, asynchronous, Ethernet, SDLC	Synchronous, asynchronous, Ethernet, SDLC	Synchronous, asynchronous, Ethernet, SDLC	Asynchronous, 3270 BSC[2], 3780/2780 BSC, RFT/X.25, DNIO, SNA[3]/X.25, SNA/SDLC	SDLC, 3270, 2880, X.25, Ethernet	SDLC, 3270, 2880, X.25, Ethernet
Memory Size in Bytes (Minimum-Maximum)	256K-768K	128K-768K	128K-768K	512K-15M	512K-1.75M	512K-2M	512K-2M
Purchase Price (Basic Configuration)	$2,995	$2,295	$2,395	$3,995	$9,995	$25,400	$45,600
Operating Systems	MS-DOS	MS-DOS	MS-DOS	MS-DOS, Xenix	DXIO, Dnos	DXIO, Dnos	DXIO, Dnos
I/O Ports	1	1	1	2	7	16	40
I/O Channel Speed (Bit/Sec.)	To 19.2K	To 19.2K	To 19.2K	To 19.2K	To 6M	To 6M	To 6M

1. Synchronous Data Link Control.
2. Binary Synchronous Communications.
3. Systems Network Architecture.

CW Chart

Apple Computer, Inc.

Characteristics / System	Apple IIc	Apple IIe	Macintosh
Address Space	8-bit	8-bit	32-bit
Communications Protocols	Asynchronous	Asynchronous	Synchronous, asynchronous
Memory Size in Bytes (Minimum-Maximum)	128K	64K-128K	128K-512K
Purchase Price (Basic Configuration)	$1,295	$895	$2,195
Operating Systems	Apple DOS, Apple Prodos	Apple DOS, Apple Prodos	Macintosh operating system
I/O Ports	5	10	5
I/O Channel Speed (Bit/Sec.)	To 19.2K	To 19.2K	To 230K

CW Chart

Kaypro Corp.

Characteristics / System	Kaypro 2X	Kaypro 10	Kaypro 16	Kaypro 286i Model A	Kaypro 200
Address Space	8-bit	8-bit	16-bit	16-bit	16-bit
Communications Protocols	Asynchronous	Asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous
Memory Size in Bytes (Minimum-Maximum)	64K	64K	256K-640K	512K-640K	256K-640K
Purchase Price (Basic Configuration)	$1,595	$2,795	$3,295	$2,995	$1,995
Operating Systems	CP/M	CP/M	MS-DOS	MS-DOS	MS-DOS
I/O Ports	3	3	2	0	1
I/O Channel Speed (Bit/Sec.)	Not available	Not available	Not available	Not available	Not available

CW Chart

Digital Equipment Corp.

Characteristics / System	Rainbow 100B	Rainbow 190	Decmate II	Decmate III	Professional 325	Professional 350	Professional 380
Address Space	8- or 16-bit	8- or 16-bit	12-bit	12-bit	16-bit	16-bit	16-bit
Communications Protocols	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous, SDLC[1], HDLC[2], BSC[3], DDCMP[4]	Synchronous, asynchronous, SDLC, HDLC, BSC, DDCMP
Memory Size in Bytes (Minimum-Maximum)	128K-896K	640K-896K	96K	96K	512K	512K-1M	512K-2M
Purchase Price (Basic Configuration)	$2,415	$6,495	$3,745	$2,695	$3,025	$4,025	$6,025
Operating Systems	CP/M 86/80, MS-DOS	CP/M 86/80, MS-DOS	WPS, COS 310, MS-DOS, OS/278, CP/M	WPS, COS 310, OS/278, CP/M	UCSD Pascal, P/OS, CP/M 80, RT-11, Venix, Standard Micromumps	UCSD Pascal, P/OS, CP/M 80, RT-11, Venix, Standard Micromumps	UCSD Pascal, P/OS, CP/M 80, RT-11, Venix, Standard Micromumps
I/O Ports	2	2	2	3	3	3	3
I/O Channel Speed (Bit/Sec.)	To 19.2K	To 19.2K	To 19.2K	To 19.2K	To 19.2K	To 19.2K	To 19.2K

1. Synchronous Data Link Control.
2. High-Level Data Link Control.
3. Binary Synchronous Communications.
4. Digital Data Communications Message Protocol.

CW Chart

HARDWARE ROUNDUP

Zenith Data Systems Corp.

System / Characteristics	Z100	Z138	Z148	Z150	Z160	Z171	Z200
Address Space	8- or 16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit
Communications Protocols	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous
Memory Size in Bytes (Minimum-Maximum)	192K-768K	256K-640K	128K-640K	128K-720K	320K-720K	256K-640K	512K-16M
Purchase Price (Basic Configuration)	$3,629	$1,699	$1,499	$2,199	$2,399	$2,699	$3,999
Operating Systems	Z-DOS, CP/M 86	MS-DOS	MS-DOS	MS-DOS	MS-DOS	MS-DOS	MS-DOS, Xenix
I/O Ports	3	3	3	3	3	3	3
I/O Channel Speed (Bit/Sec.)	To 384K	To 19.2K	To 19.2K	To 19.2K	To 19.2K	To 19.2K	To 19.2K

CW Chart

IBM

System / Characteristics	Portable Personal Computer	Personal Computer	Personal Computer XT	Personal Computer AT
Address Space	16-bit	16-bit	16-bit	16-bit
Communications Protocols	Synchronous, asynchronous, SDLC[1], BSC[2]	Synchronous, asynchronous, SDLC	Synchronous, asynchronous, SDLC	Synchronous, asynchronous, SDLC, PC Network
Memory Size in Bytes (Minimum-Maximum)	256K-512K	256K-640K	256K-640K	256K-3M
Purchase Price (Basic Configuration)	$2,895	$2,295	$3,895	$3,995
Operating Systems	PC-DOS, CP/M, UCSD Pascal	PC-DOS, CP/M 86, UCSD Pascal	PC-DOS, CP/M, UCSD Pascal	PC-DOS, PC Xenix
I/O Ports	1	1	1	0
I/O Channel Speed (Bit/Sec.)	To 9.6K	To 9.6K	To 9.6K	To 9.6K

1. Synchronous Data Link Control.
2. Binary Synchronous Communications.

CW Chart

Hewlett-Packard Co.

System / Characteristics	The Portable	The Portable Plus	HP 150	HP 85B	HP 86B
Address Space	16-bit	16-bit	16-bit	8-bit	8-bit
Communications Protocols	Asynchronous	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Memory Size in Bytes (Minimum-Maximum)	272K	128K-896K	256K-640K	16K-32K	64K-640K
Purchase Price (Basic Configuration)	$2,995	$2,295	$3,495	$3,495	$1,695
Operating Systems	MS-DOS	MS-DOS	MS-DOS	Integrated into system	HP, CP/M
I/O Ports	2	2	4	4	4
I/O Channel Speed (Bit/Sec.)	To 5K	To 5K	To 9.6K	176	176

CW Chart

Compaq Computer Corp.

System / Characteristics	Compaq Portable	Compaq Plus	Deskpro Model 1	Deskpro Model 2	Deskpro Model 3	Deskpro Model 4	Portable 286 Model 1	Portable 286 Model 2	Deskpro 286 Model 1	Deskpro 286 Model 2
Address Space	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit
Communications Protocols	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous	Synchronous, asynchronous
Memory Size in Bytes (Minimum-Maximum)	128K-640K	128K-640K	128K-640K	256K-640K	256K-640K	640K	256K-2.6M	640K-2.6M	256K-8.2M	512K-8.2M
Purchase Price (Basic Configuration)	$2,495	$3,999	$2,240	$2,644	$4,244	$5,544	$4,499	$6,299	$4,244	$5,999
Operating Systems	MS-DOS	MS-DOS	MS-DOS	MS-DOS	MS-DOS	MS-DOS	MS-DOS	MS-DOS	MS-DOS	MS-DOS
I/O Ports	2	2	2	2	2	2	2	2	2	2
I/O Channel Speed (Bit/Sec.)	To 19.2K	To 19.2K	To 19.2K	To 19.2K	To 19.2K	To 19.2K	To 19.2K	To 19.2K	To 19.2K	To 19.2K

CW Chart

HARDWARE ROUNDUP

Supermicros and minicomputers

Honeywell, Inc.

System / Characteristics	Microsystem 6/10	DPS 6/22	DPS 6/40	DPS 6/42	DPS 6/45	DPS 6/70	DPS 6/75
Address Space	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit
Communications Protocols	Asynchronous, BSC[1], SNA/SDLC[2], HDLC/DSA[3], LHDLC, RAP6, TTY	Asynchronous, BSC, SNA/SDLC, HDLC/DSA, LHDLC, RAP6, TTY	Asynchronous, BSC, SNA/SDLC, HDLC/DSA, LHDLC, RAP6, TTY	Asynchronous, BSC, SNA/SDLC, HDLC/DSA, LHDLC, RAP6, TTY	Asynchronous, BSC, SNA/SDLC, HDLC/DSA, LHDLC, RAP6, TTY	Asynchronous, BSC, SNA/SDLC, HDLC/DSA, LHDLC, RAP6, TTY	Asynchronous, BSC, SNA/SDLC, HDLC/DSA, LHDLC, RAP6, TTY
Memory Size in Bytes (Minimum-Maximum)	512K-1M	512K-1.8M	512K-2M	1M-2M	512K-2M	2M	1M-2M
Purchase Price (Basic Configuration)	$6,995[4]	$15,995[5]	$27,000[6]	$19,300[7]	$20,000[8]	$30,500[8]	$35,000[9]
Operating Systems	Gcos 6	Gcos 6	Gcos 6	Gcos 6	Gcos 6	Gcos 6	Gcos 6
I/O Ports	2	1-10	1-32	1-32	1-32	1-32	1-96
I/O Channel Speed (Bit/Sec.)	1.2M	1.2M	1.2M	1.2M	1.2M	1.2M	1.2M

1. Binary Synchronous Communications.
2. Systems Network Architecture/Synchronous Data Link Control.
3. High-Level Data Link Control/Distributed Systems Architecture.
4. Includes 640K bytes of main memory, a 2M-byte hard disk drive, a 650K-byte diskette unit, a monochromatic CRT, two asynchronous I/O ports and a keyboard.
5. Includes 1M byte of main memory, 68M bytes of fixed disk storage, a 5¼-in. 650K-byte diskette drive, five RS-422A asynchronous ports, one expansion cabinet, a commercial instruction processor and a scientific instruction processor.
6. Includes a 40M-byte disk drive, a 5¼-in. diskette drive, a communications controller, four RS-422A asynchronous ports and a commercial instruction processor.
7. Includes a commercial instruction processor, a memory management unit, a system control facility, 1M byte of main memory, a disk control unit, a 650K-byte diskette unit and a 16-line communications controller with four RS-422A ports.
8. Includes a commercial instruction processor, 1M byte of main memory, a system control facility, a 650K-byte diskette unit, a communications controller with four RS-422A ports, a console and 8K bytes of cache memory.
9. Includes a commercial instruction processor, a memory management unit, a system control facility, 2M bytes of main memory, a disk controller, a communications controller with four RS-422A ports and 8K bytes of cache memory.

CW Chart

Altos Computer Systems, Inc.

System / Characteristics	486	580	586	986	2086
Address Space	16-bit	8-bit	16-bit	16-bit	16- or 32-bit
Communications Protocols	Asynchronous, BSC[1]	Asynchronous, BSC, 3270/3276	Asynchronous, BSC, X.25, SNA[2], Worknet	Asynchronous, BSC, X.25, SNA, Worknet	Asynchronous, BSC, X.25, SNA, Worknet
Memory Size in Bytes (Minimum-Maximum)	512K	192K	512K-1M	1M	2M
Purchase Price (Basic Configuration)	$6,490	$4,490	$8,000	$11,000	$19,900
Operating Systems	Xenix	MPM II	Xenix, MPM 86	Xenix, MPM 86	Xenix
I/O Ports	5	5	6	10	20
I/O Channel Speed (Bit/Sec.)	19.2K	Not available	19.2K	Not available	19.2K

1. Binary Synchronous Communications.
2. Systems Network Architecture.

CW Chart

Hewlett-Packard Co.

System / Characteristics	HP 250	HP 1000
Address Space	16-bit	16-bit
Communications Protocols	Synchronous, asynchronous	Synchronous, asynchronous
Memory Size in Bytes (Minimum-Maximum)	256K-896K	128K-4M
Purchase Price[1] (Basic Configuration)	$16,800	$4,730
Operating Systems	OS/6	RTE-L, RTE-XL
I/O Ports	5	8
I/O Channel Speed (Bit/Sec.)	To 9.6K	Not available

1. Base list price.

CW Chart

Nixdorf Computer Corp.

System / Characteristics	8850 Microfive	8850	8860	8870
Address Space	16-bit	16-bit	16-bit	16-bit
Communications Protocols	BSC[1], SNA/SDLC[2]	BSC, SNA/SDLC	Synchronous, asynchronous, SNA/SDLC	Synchronous, asynchronous, X.25
Memory Size in Bytes (Minimum-Maximum)	128K	128K	512K-2M	256K-1M
Purchase Price (Basic Configuration)	$10,000	$27,500	$19,000	$13,500
Operating Systems	Dpex	Dpex	Dipos	Niros
I/O Ports	2	2	1-24	1-24
I/O Channel Speed (Bit/Sec.)	Not available	Not available	Not available	9.6K

1. Binary Synchronous Communications.
2. Systems Network Architecture/Synchronous Data Link Control.

CW Chart

NCR Corp.

System / Characteristics	Minitower	Tower XP
Address Space	16-bit	16-bit
Communications Protocols	Asynchronous, TTY, BSC[1], 2780/370, 3270 BSC, SNA/SDLC[2], X.25, Towernet	Asynchronous, TTY, BSC, 2870/370, 3270 BSC, SNA/SDLC, X.25, Towernet
Memory Size in Bytes (Minimum-Maximum)	512K-2M	512K-8M
Purchase Price (Basic Configuration)	$6,495	$8,495
Operating Systems	Unix	Unix
I/O Ports	9	18
I/O Channel Speed (Bit/Sec.)	5M	5M

1. Binary Synchronous Communications.
2. Systems Network Architecture/Synchronous Data Link Control.

CW Chart

HARDWARE ROUNDUP

Digital Equipment Corp.

System / Characteristics	Micro PDP-11/23	Micro PDP-11	Micro PDP-11/73	PDP-11/24	PDP-11/44	PDP-11/84	Microvax I	Microvax II
Address Space	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	32-bit	32-bit
Communications Protocols	X.25, SNA/SDLC[1], Decnet, Ethernet	X.25, SNA/SDLC, Decnet, Ethernet	X.25, SNA/SDLC, Decnet, Ethernet	X.25, SNA/SDLC, Decnet, Ethernet	X.25, SNA/SDLC, Decnet, Ethernet	X.25, SNA/SDLC, Decnet, Ethernet	X.25, SNA/SDLC, Decnet, Ethernet	X.25, SNA/SDLC, Decnet, Ethernet
Memory Size in Bytes (Minimum-Maximum)	256K-4M	256K-4M	256K-4M	1M-4M	1M-4M	1M-4M	512K-1.5M	2M-5M
Purchase Price (Basic Configuration)	$10,000	$7,300	$7,800	$26,900	$44,700	$20,000	$10,000	$20,000
Operating Systems	RT-11, RSTS/E, RSX-11M, RSX-11M+, Ultrix-11, RSX-11, RSX-11S	RT-11, RSTS/E, RSX-11M, RSX-11M+, Ultrix-11, RSX-11, RSX-11S	RT-11, RSTS/E, RSX-11M, RSX-11M+, Ultrix-11, RSX-11, RSX-11S	RT-11, RSTS/E, RSX-11M, RSX-11M+, Ultrix-11, RSX-11, RSX-11S	RT-11, RSTS/E, RSX-11M, RSX-11M+, Ultrix-11, RSX-11, RSX-11S	RT-11, RSTS/E, RSX-11M, RSX-11M+, Ultrix-11, RSX-11, RSX-11S	MicroVMS, Microvax Ultrix 32, ELN	MicroVMS, Microvax Ultrix 32, ELN
I/O Ports	1	1	1	1	1	1	Not available	Not available
I/O Channel Speed (Bit/Sec.)	1.3M	1.3M	1.3M	1.3M	1.3M	1.3M	Not available	Not available

1. Systems Network Architecture/Synchronous Data Link Control.

CW Chart

IBM

System / Characteristics	Series/1	System/36
Address Space	16-bit	16- or 24-bit[1]
Communications Protocols	Synchronous, asynchronous, BSC[2], SDLC[3]	BSC, SDLC/SNA[4]
Memory Size in Bytes (Minimum-Maximum)	32K-1M	128K-1.75M
Purchase Price (Basic Configuration)	$7,760	$8,090[5]
Operating Systems	RPS, EDX, CPS	SSP
I/O Ports	Not available	10
I/O Channel Speed (Bit/Sec.)	Not available	Not available

1. Depending on the CPU.
2. Binary Synchronous Communications.
3. Synchronous Data Link Control.
4. Systems Network Architecture.
5. For a System/36 Personal Computer.

CW Chart

NEC Information Systems, Inc.

System / Characteristics	Astra 215	Astra 220	Astra 330 VS	Astra 350 VS	Astra 370 VS
Address Space	16-bit	16-bit	32-bit	32-bit	32-bit
Communications Protocols	Synchronous, asynchronous, 3780	3270, 3780, 3770, SNA[1], HDLC[2], X.25	3270, 3780, 3770, SNA, HDLC, X.25	3270, 3780, 3770, SNA, HDLC, X.25	3270, 3780, 3770, SNA, HDLC
Memory Size in Bytes (Minimum-Maximum)	384K-512K	384K-512K	1M-1.5M	1M-2M	1M-4M
Purchase Price (Basic Configuration)	$8,000	$12,000	$18,500	$22,000	$27,000
Operating Systems	Itos	Itos	Itos, VS	Itos, VS	Itos, VS
I/O Ports	3	7	16	32	48
I/O Channel Speed (Bit/Sec.)	To 8M	Not available	Not available	Not available	Not available

1. Systems Network Architecture.
2. High-Level Data Link Control.

CW Chart

Motorola/Four Phase Systems, Inc.

System / Characteristics	IV/40	IV/50	IV/60	IV/65	IV/70	IV/80	IV/90	IV/95
Address Space	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit
Communications Protocols	Synchronous, asynchronous, BSC[1], Hasp, SDLC[2]	Synchronous, asynchronous, BSC, Hasp, HDLC[3]	Synchronous, asynchronous, BSC, Hasp, SDLC, SNA[4]	Synchronous, asynchronous, BSC, Hasp, SDLC, SNA	Synchronous, asynchronous, BSC, Hasp, SDLC	BSC, X.25, asynchronous, SNA/SDLC, SNA	BSC, X.25, asynchronous, SNA/SDLC, SNA	BSC, X.25, asynchronous, SNA/SDLC, SNA
Memory Size in Bytes (Minimum-Maximum)	24K-96K	24K-96K	240K-768K	288K-768K	48K-96K	288K-1.5M	96K-768K	480K-1.5M
Purchase Price (Basic Configuration)	$35,713	$46,934	$69,203	$79,818	$55,870	$95,124	$75,597	$112,039
Operating Systems	Idos	Idos	MFE	MFE	Idos	MFE	MFE	MFE
I/O Ports	3	3	38	39	48	52	24-39	68
I/O Channel Speed (Bit/Sec.)	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available

1. Binary Synchronous Communications.
2. Synchronous Data Link Control.
3. High-Level Data Link Control.
4. Systems Network Architecture.

CW Chart

talk to offers
products,

solutions
instead of my need
"Better

AT&T knows the
What you've already
as what you will buy.

Today, buying any computer product means thinking about where you've been—and where you're going.

AT&T understands this. Our computers are designed to protect your investment—with integrated products and solutions that help your system work *as* a system.

With AT&T Computers you can feel confident that your investment is and will remain a safe, sound business decision. It will pay off handsomely in increased productivity today and easy, efficient expansion tomorrow.

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1. Will the computer products I'm about to buy work with my existing system?

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In fact, AT&T Computers can talk to IBM* mainframes for easy access to host data using SNA/3270 or BSC/3270 protocols. Also available at a competitive price is the AT&T E4540 family of 3270-compatible controllers, keyboards and displays.

Our recently enhanced 3B Computers offer the performance advantage of **UNIX**™ System V in a departmental system, yet can be networked with existing MS-DOS**-based PCs.

Built on the principle of non-obsolescence, the DATAPHONE® II System is a full line of high-performance modems, multiplexers, data service units, and diagnostic control devices. These combine data transmission and sophisticated network management capabilities, thereby maximizing uptime of either simple or complex networks.

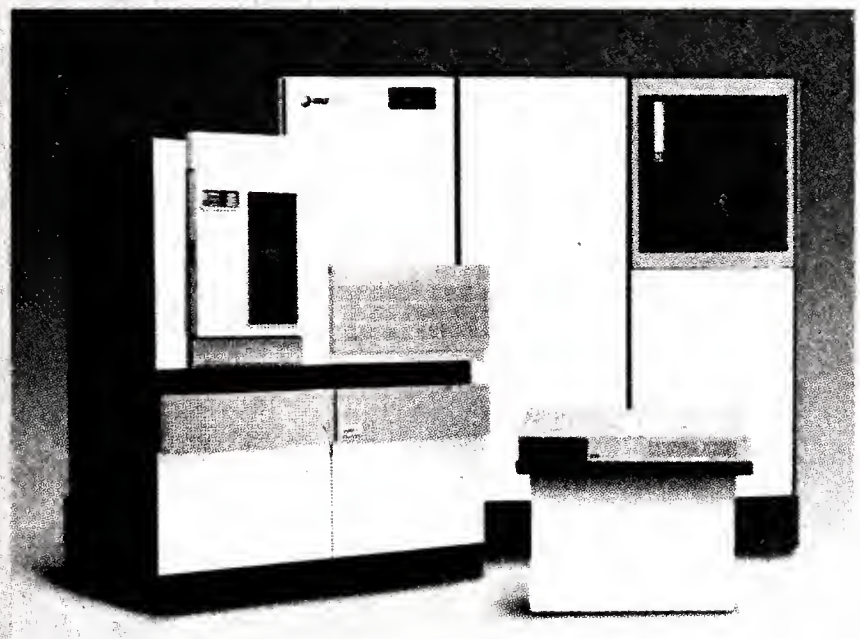
2. Will these products deliver the capabilities I need today? Am I getting my money's worth in terms of price and performance?

AT&T can answer "yes" to both questions.

reality of your computer needs. bought is just as important

Our line of high-performance computer products can be linked together to cost effectively deliver end-to-end communication and information management—from desktop to department, and from department to mainframe.

Our MS-DOS-based AT&T PC 6300 is twice as fast as the IBM PC, and has built-in color graphics capabilities and an easy-to-expand design.



THE COMPUTERS WITH THE FUTURE BUILT IN

AT&T 3B2, AT&T 3B15 and AT&T 3B20 Computers

Taking advantage of the **UNIX** System's multi-tasking, multi-user features, the AT&T **UNIX** PC offers a unique combination of power, ease of use and communications capabilities.

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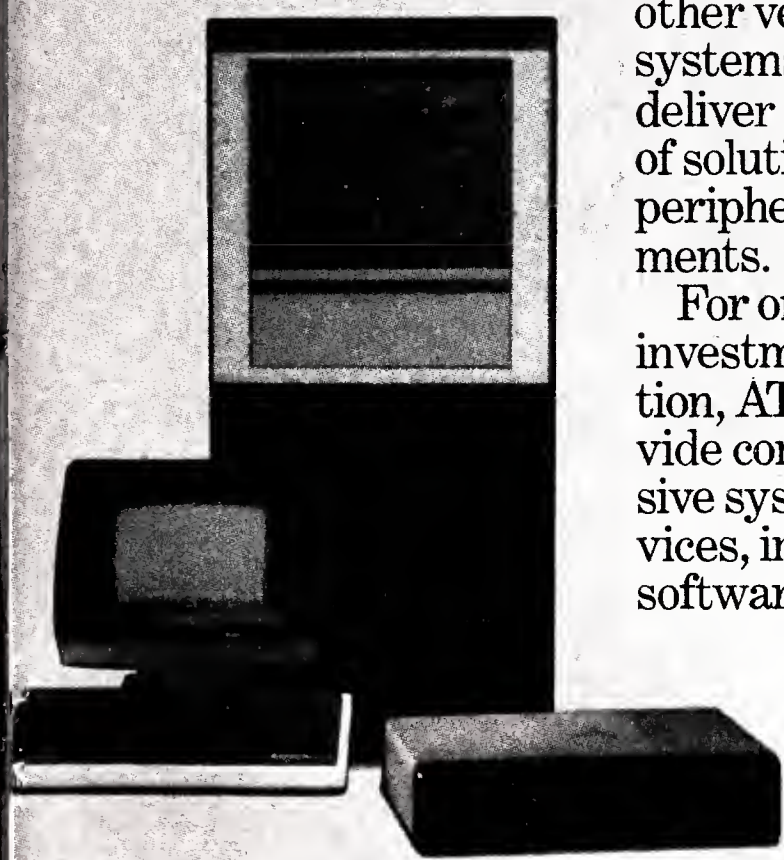


AT&T DATAPHONE II System

3. What about tomorrow? Will these products keep my growth path open to accommodate future needs, especially in terms of networking capabilities?

No need to worry about the future when you start with The Computers With The Future Built In from AT&T.

As technology advances, AT&T will enhance and support its products, increase performance, and maintain compatibility with industry standards.

Our commitment to an open architecture and support of industry standards—MS-DOS, **UNIX** System V and SNA/3270 and BSC/3270 protocols—gives you the flexibility to satisfy your applications needs.

The power of the AT&T 3B Computer family can be networked in a variety of ways. Because they run **UNIX** System V, the 3B Computers offer an opportunity to build an open system with hardware independence and software portability.

What's more, our **UNIX** System V software base is growing by volumes.

AT&T's Information Systems Network links your equipment in a single corporate-wide network. The AT&T STARLAN NETWORK is our low-cost local-area network that uses existing phone wiring to tie your PCs together.

However your needs change, one thing won't change: Your investment is protected with AT&T Computers.

For a more detailed look at what AT&T computer products can do for you, just turn the page.

See what makes AT&T computer products a sound investment.

AT&T PC 6300

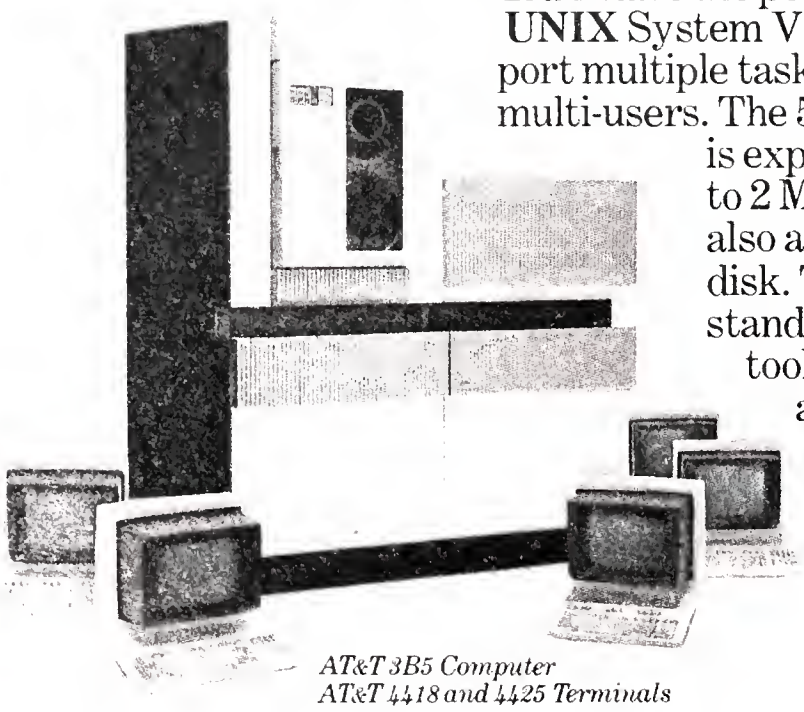
AT&T UNIX PC

Whether you start with a complete system or a single computer, these communications-based computer products are designed to protect your investments—past, present and future.

Our new **AT&T 3B2/400** Computer takes full advantage of **UNIX System V.** This true 32-bit micro offers full hardware floating point performance, streaming tape backup and up to 4 MB main memory. Supporting up to 25 users, the 3B2/400 offers plenty of room for expansion.

For even higher storage capacity and performance, see what our **3B15** minicomputer can do. The 3B15 is equipped with a high-performance **WE™ 32100** microprocessor with main memory up to 16 MB. It supports up to 60 users in a number of configurations. Other features include demand-paging memory management, file and record locking, and standard floating point performance.

For those looking for the next step forward in personal computers, the **AT&T UNIX PC** offers a unique combination of computer capabilities. You'll have the power of **UNIX** System V to support multiple tasks and multi-users. The 512 RAM is expandable to 2 MB. There's also a 20 MB hard disk. This outstanding business tool also features a built-in modem and communications features to easily access remote processors and departmental file servers.

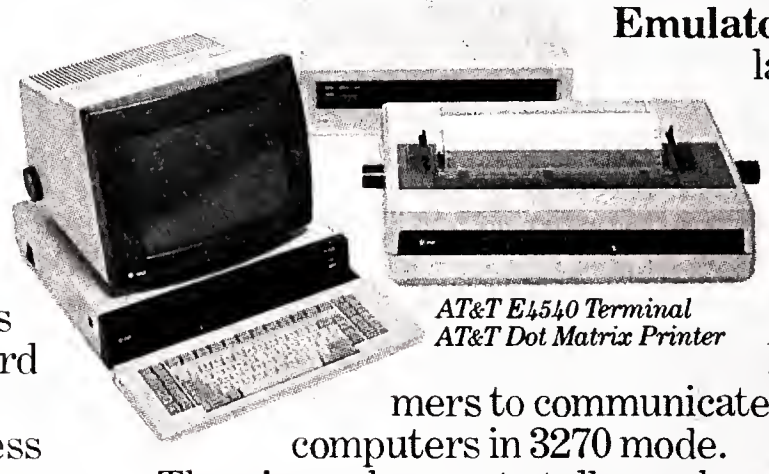


AT&T 3B5 Computer
AT&T 4418 and 4425 Terminals

The **DATAPHONE II** System is a family of digital and analog modems, multiplexers, data service units, and diagnostic control devices for multilevel network management and control. We have added the **DATAPHONE II 2500** and **2600 Series Digital Data Service Units** to the family. An integrated DSU and channel service unit in one compact, easy-to-operate unit. It features a graphic LCD display for instant recognition of test results and is compatible with **DATAPHONE II** equipment.

The **AT&T E4540** family offers true 3270 compatibility, and a choice of keyboards, controllers and screen colors. With Asynchronous Host Adapter option, you'll be able to switch back and forth easily between synchronous and asynchronous applications.

Our connectivity products conform to industry standards to insure that AT&T 3B departmental computers as well as desktop workstations can access your mainframe applications. For example, **SNA/3270 Emulator +** software provides fully configured SNA IBM 3274 controller emulation; **BSC/3270 Emulator +** software emulates the BSC IBM 3274 cluster controller.



AT&T E4540 Terminal
AT&T Dot Matrix Printer

AT&T Application Program Interface access routines allow C language programmers to communicate directly to host computers in 3270 mode.

There's much more to tell you about AT&T computer products, and how they can help solve your business problems.

So before you invest your computer dollars, invest a few minutes of your time with an AT&T Information Systems Account Executive, an authorized AT&T supplier, or call 1 800 247-1212.

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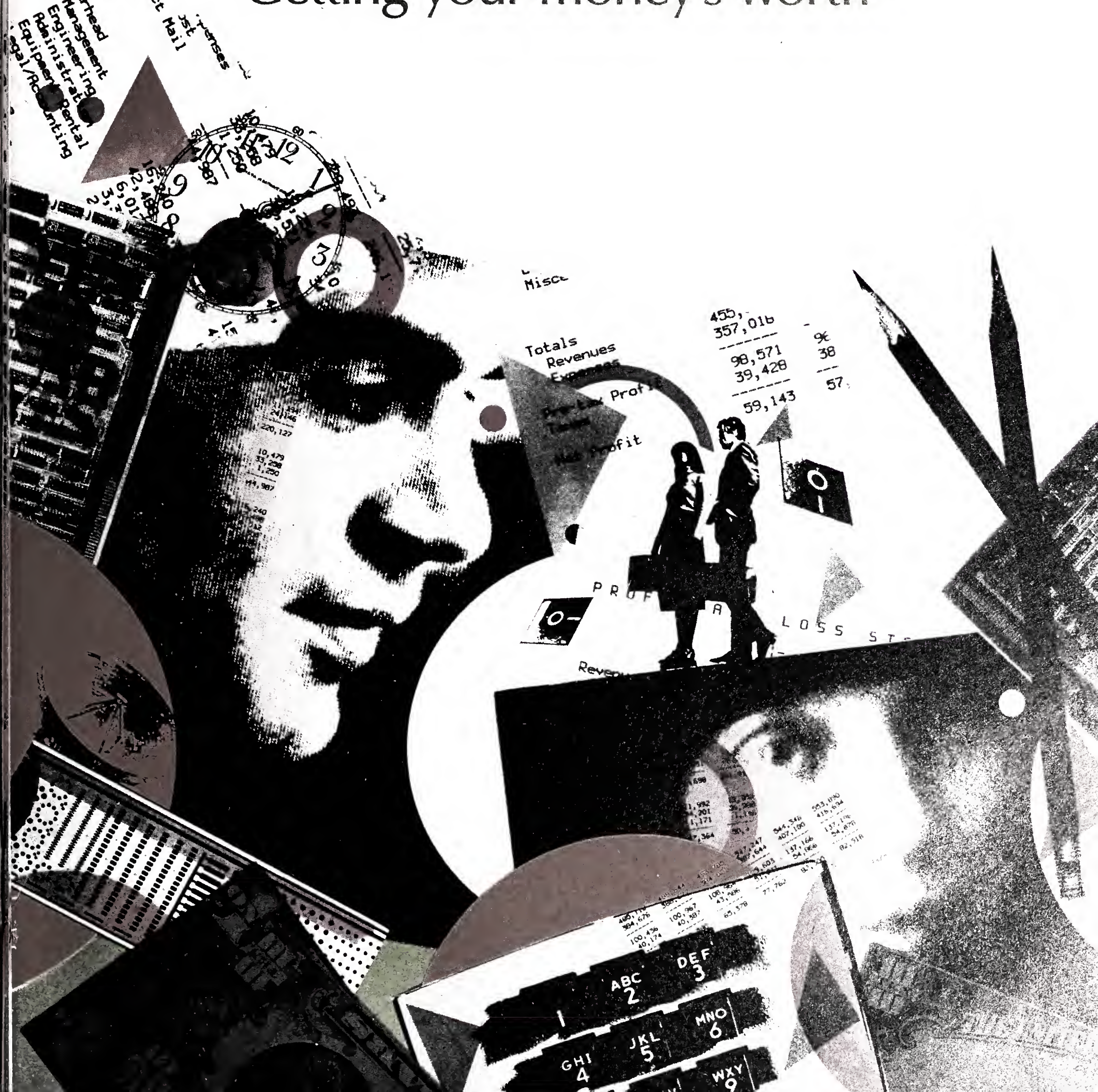
AT&T
The right choice.

COMPUTERWORLD

Update

September 2, 1985

Consultants: Getting your money's worth



Update

Choosing and using consultants

By Glenn Rifkin
Update Editor

Good counselors lack no clients.
— *William Shakespeare*

Frank Allen has to think a minute to come up with a success story. It isn't that the vice-president of information systems practice for Arthur D. Little, Inc. (ADL) lacks a bountiful supply of happy endings. But illustrating perfectly the full benefits of an outside consultant — that takes some thought. Allen then describes a client, a large chemical company, that had come to recognize that the computer support in its major research laboratory was second rate. An engineer within the company was asked to investigate the problem and quickly realized he needed outside help. He set up a formal committee to tackle the problem and brought in Allen as well as a representative from IBM.

"We worked as a team," Allen says, "and spent six intensive weeks of 10-hour days attacking the problem. We realized that the lab, which was a Digital Equipment Corp. shop, needed to be a two-vendor shop, at least for a while."

Based on the team's recommendations, a new IBM mainframe was installed, and, according to Allen, the lab's computer support is now top rate. "It was a very satisfying assignment," Allen notes, "except that my lawn died."

For the Bobst Corp., a printing machine manufacturer in Roseland, N.J., about to convert to a new manufacturing resource planning (MRP) system, the decision to use an outside consultant came from above the data processing shop. Top management directed that a consultant be brought in to ensure a smooth switch over.

According to Gary Gittleson, Bobst's MIS director, "Top management wanted a safety net. MRP is a big system, and they felt DP couldn't handle it alone. MRP is a new concept, and there are no standards yet. You can't go to a book for an answer."

Despite the dictum, Gittleson insists there is no resentment from the DP staff. "There are the usual interface problems between DP and users, but MRP is clearly so different from what we do here that there is no resentment. The consultant earns his money."

'The computer industry has been characterized by phenomenal change, and change creates uncertainty, and uncertainty creates demand for consultants.'
— Michael Hammer
Hammer & Associates

In Tulsa, Okla., Gary Stice recalls the displeasure he felt at his data processing job when an outside consultant was brought in. "I didn't want a consultant coming in the door, sitting next to me asking a lot of questions and getting paid three times what I was making," Stice says. "It can certainly cause conflict."

Stice is now an independent software consultant.

Some people swear by them; some swear at them. But one thing is clear: Independent computer consultants and large consulting firms both have more work than they can handle, despite the computer industry sales slump. It is impossible, because of the shapes and flavors consultants come in, to number precisely the profession. But a few of the following figures may be illustrative:

- According to the *U.S. Census of Service Industries*, the demand for information systems consulting has more than quadrupled since 1978.
- The Independent Computer Consultants Association in St. Louis currently carries a listing of more than 1,600 member firms representing more than 4,000 independent computer consultants.
- Arthur Andersen & Co., the Chicago-based international accounting and audit firm, plans to hire nearly 2,000 recent college graduates for its management information consultant division before the end of the year, bringing its total manpower in this group to more than 7,000 worldwide. Arthur Andersen estimates that it was involved in 4,000 DP/MIS engagements last year alone.
- The second largest computer maker, DEC, spent more than $25 million on outside consulting in 1984.

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COVER ILLUSTRATION BY KAREN WATSON

Update

Abundantly clear is this: Find a DP/MIS-related question, and there will be a long line of outside consultants ready to answer it. Consulting, a burgeoning business across many industries, has found a warm bed in high technology, and the explosive growth both in consultants and in consulting dollars appears to have no end in sight.

According to Michael Hammer, president of Hammer & Associates, a Cambridge, Mass.-based consulting firm, consulting has become institutionalized in the MIS world. It is standard, he points out, to retain consultants in MIS while in many other functional business areas, consultants are rarities.

"The computer industry has been characterized by phenomenal change, and change creates uncertainty, and uncertainty creates demand for consultants," Hammer says.

Virtually every DP/MIS manager uses outside consultants at some point, whether reluctantly or enthusiastically. Consultants and clients alike agree that successful relationships require great care and feeding. This *Computerworld* Update explores the ways users can get the most out of the consultants they hire.

When to look outside

The term "consultant" has become overused to the point of abuse in recent years. Virtually anyone can — and it seems does — print up business cards and letterhead and consult. Contract programmers, once considered simply hired hands, are now calling themselves consultants. Everyone from strategic planners to management specialists has hooked on the tag (see story Update/15).

This confusion has created a minefield for DP/MIS managers, not to mention a plethora of potential legal hassles for consultants. California, for example, is trying to ban independents, arguing that they are simply employees seeking to avoid certain tax obligations by calling themselves consultants. Congressional hearings are under way to determine whether Big Eight accounting firms should be allowed to handle DP consulting for firms they audit.

Before deciding how to choose a consultant, the DP manager must decide when it is appropriate to look outside. It is often a more complex decision then it appears, especially for large corporations with vast, in-house DP/MIS resources.

A consultant can provide as many headaches as solutions. Internal politics and morale are a constant worry for the DP manager. With their high hourly salaries, consultants can cause loud grumbling among DP staff members who think they could have handled the task themselves — and at considerably less cost.

Consultants are expensive. James Martin, the noted data processing author and lecturer, earns a reported $25,000 per day, while other well-known consultants command $5,000 to $10,000 per day plus expenses. The large firms often charge upwards of $200 per hour, while the technical specialists generally run in the $100 per hour range.

Most Fortune 1,000 corporations, says Harvey Poppel, a consultant with Broadview Associates in Fort Lee, N.J., "have reached a point where the things that were done in the past are changing. The DP manager is becoming an anachronism. If they don't adapt, they will become dinosaurs. This makes DP a fertile field for consultants."

For technical issues such as micro-to-mainframe links, local-area networks, managing microcomputers, office automation, telecommunications, information systems architectures, artificial intelligence and general systems integration, the know-how may not be available from an internal staff that is struggling to fill backlogged demands of the daily business.

"You can read about these things," says William Inmon, a consultant with Coopers & Lybrand in Denver, "but it's like golf and sex; until you do it, it's all theory. There's no replacement for experience."

Internal staff may also not have the time and experience to follow vendor trends in both hardware and software. The technology changes so quickly that outside expertise, devoted to just such a task, may become essential.

In addition, as information systems have begun to change the nature of many industries, the DP/MIS shop is making the transition from simply a service organization to a strategic part of the company's business. This difficult repositioning often dictates the need for outside advice, and DP management consultants are reaping the benefits of this change.

"The expertise required goes far beyond technical talent," Poppel declares. "You need a range of business knowledge, and it is rare for the DP staff to be exposed to that."

"We use consultants for two reasons," says William Harris, director of information services for Coca Cola, U.S.A. in Atlanta. "There are times when we are looking for an independent viewpoint and other times when we just don't have the experience in-house."

"The consultant isn't there to run your business but to supplement your internal skill," adds Ian Scott, vice-president of information systems for Dart & Kraft, Inc. in Northbrook, Ill. "They've seen the same situation over and over and been through the problem before. It's the first time for us, and they provide added value."

For many clients, the outside consultant serves as a mediator and a sparkplug who cuts through internal politics and territorial bickering to get projects moving.

"We brought in a consultant mainly to solve internal arguments, bring about a group consensus and get things moving forward," says Clay Snyder, assistant department head of technical information at General Motors Corp.'s Research Laboratories in Warren, Mich.

"We had Nolan Norton in here to do a study on how the MIS resource should assist in making the company run," adds Herman Cordes, MIS manager for Raymond Kaiser Engineers, Inc. in San Francisco. "Some of their recommendations were enacted, and others were shelved. But the biggest thing they did was act as a catalyst for bringing people together. People from all departments had to make time to discuss their problems, and it really made a difference."

For the leading management consulting firms, such as Nolan Norton, Booz Allen & Hamilton, Inc. and ADL, the questions are beginning to emanate more from corporate management than the DP shop.

Poppel

According to Robert Howe, vice-president in Booz Allen's Chicago office, clients generally come to them with several business questions:

- Is the company getting the proper information technology support to remain competitive with the business across the street? Howe points out that this question is particularly crucial in the banking and financial industries, in which the recent deregulation of banking has dictated the need for the highest level of information technologies.
- The cost/value relationship. Companies are spending millions on information technology, and the costs keep going up. Is the company spending enough or too much, and is it getting value for what it is spending? How can the chief executive officer measure the value of what he is receiving?
- The transition in information technology. Most large companies have basic mainframe operating systems in place, but how can DP structure itself to pursue the next opportunities that tend to be more in the end-user and decision support realms than in traditional applications?
- How does the DP/MIS manager execute all of these changes? Howe describes this as a "return to basics." The DP manager understands he needs these systems and is ready to have them, but how can they be delivered?

"DP is really catching a tremendous amount of pressure now," Howe says.

"Backlogs are through the roof, and everyone is demanding answers.

Managers are asking, 'How do I get the resources and set my priorities to execute the needed changes?' "

Where to find them

Finding the answers to these questions, and many others, is the job of the consultant. From the one-man operation to the larger Big Eight firms, there are literally thousands of consulting options from which the DP manager can choose. That choice is dictated by factors such as cost, reputation, experience, area of expertise and need (see story page Update/4).

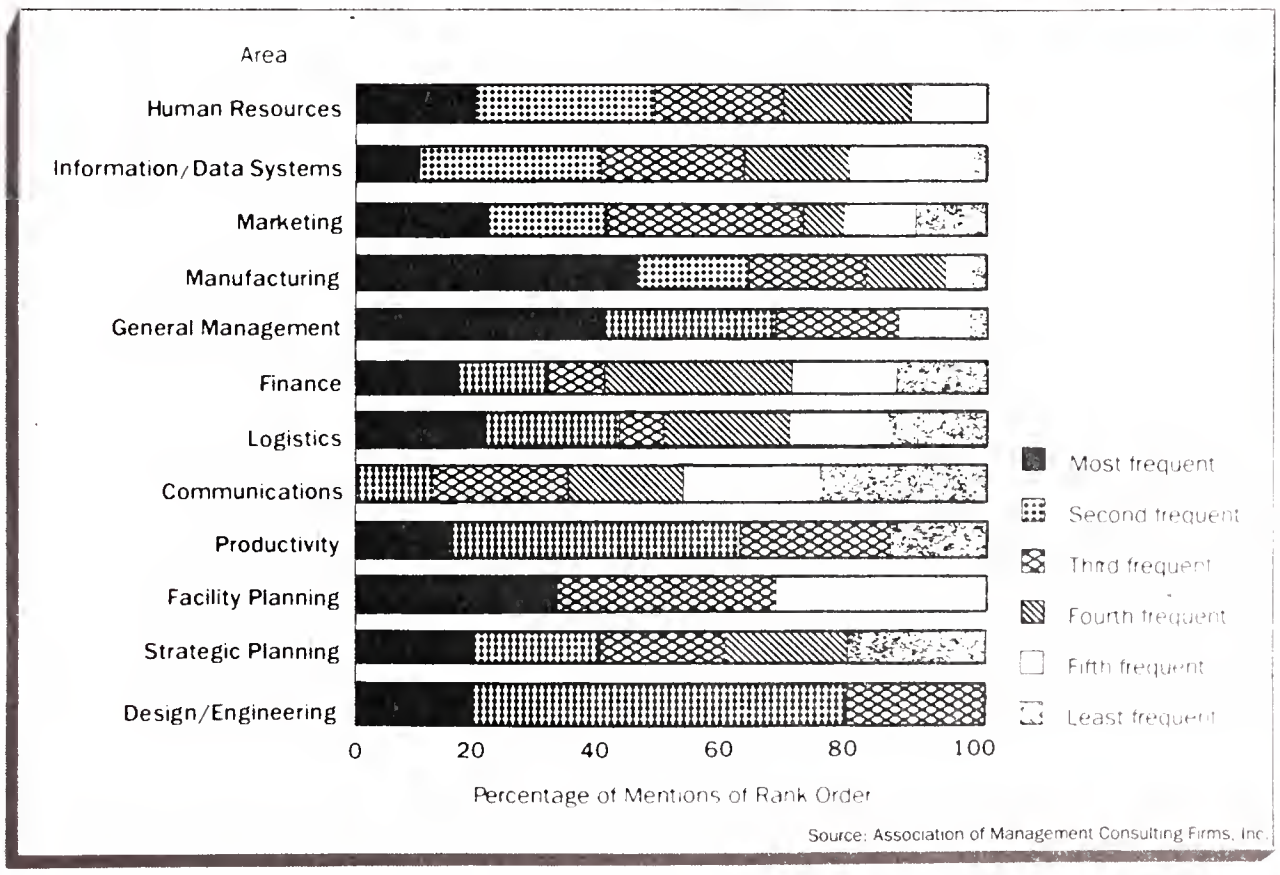
Though many Fortune 500 DP shops have already established long-term relationships with one or more consulting firms, smaller data centers, seeking outside advice for the first time, are advised to do some shopping.

Dart & Kraft's Scott says, "A structured evaluation in choosing the consultant will avoid problems down the road." He advises measuring four or five consultants by the following criteria:

- Can they clearly demonstrate the capability to

See CONSULT UPDATE/5

AREAS IN WHICH USERS TAP MANAGEMENT CONSULTANTS



Source: Association of Management Consulting Firms, Inc.

Update

Consultants: Recognizing your need for one, picking a suitable candidate

By Robin F. Goldsmith
Special to CW‡

Consultants can be intimidating. They always seem to have been hired by your boss' boss' boss. They generally show up only when your project is in trouble. They second-guess you a lot.

After a consultant has spoken behind closed doors, you may find yourself being blamed for the problem itself and also for being a lousy manager. Worst of all, the company listens to a consultant when it wouldn't pay any attention to you saying the same things.

What can you do about consultants? One approach is to get your own consultant before one gets you.

Like many systems managers, you may think you can do everything yourself. Obviously you cannot. You may not always recognize when you need assistance, or you may be afraid to admit you need help. In either case, you can be faulted for not getting the assistance.

Hiring your own consultant at least shows that you are using business judgment and doing what you can to make the project succeed. Besides, the right consultant should help provide the assistance you need to avoid the types of problems that usually attract someone else's consultant.

Even if troubles still occur, you probably will fare better. You are more likely to be considered a responsible manager who has recognized and acted upon a need for assistance. Moreover, if you have done all you can, your bosses may realize problems were caused by factors beyond your control.

Furthermore, the higher-ups are accustomed to getting assistance from consultants. By hiring your own consultant, you are beginning to exhibit management skills with which they can identify.

Here are some guidelines on how to find the right consultant to help you meet your objectives.

First, define the consultant's role. Knowing the role helps you find a suitable consultant. Moreover, it is essential for telling the consultant what needs to be done and determining whether the consultant has performed adequately.

The consultant's role should involve assisting in those areas that cause your problems. Accurately identifying these areas can be exceedingly difficult because we frequently are unaware of our real weaknesses.

Instead of addressing areas that others think are important, we tend to concentrate on our own strengths and interests. For example, systems managers have a reputation for thinking too much in terms of technology. This tendency is widely recognized as a major source of our frustration with and inability to satisfy users.

Thus, if asked to anticipate areas in need of assistance, the typical systems manager probably would stress technology — more computer power, tools and data bases, more test time, more programmers and maybe a few more technical heavyweights. You may be able to benefit from consulting assistance in technical areas, but do not overlook other areas that may still cause trouble.

How can you anticipate other true needs when they only become apparent in hindsight? The key is to put yourself in the place of people who will judge you. Try to appreciate the perspectives of your boss' boss, your user's boss and their bosses. They will judge you with respect to their areas of strength and interest.

These are the areas where you may be out of your element, where the right consultant can really help. Typical areas that seem to cause problems for systems managers may involve business strategy, systems planning, project management, financial accountability, competitive factors and the application itself.

In defining the consultant's role, you must identify not only the content area but also the specific work product you need. The consultant's product could be a review of the present system, an analysis of the feasibility of implementing various alternative systems, design of a new system, recommendations for selecting hardware and software, training staff, recruiting personnel, developing a system, installing a system or even managing a data center facility.

Once you have defined the role the consultant is to play, you need to start looking for suitable candidates. Even though consultants seem to be everywhere, it may not be easy to find one who fits your role requirements.

The most direct approach is to advertise in newspapers and trade publications. Governmental bodies generally are required to advertise publicly for goods and services, including consulting. Advertising has its drawbacks — you may get more responses than you can handle, and you may not want to publicize what you are doing.

Goldsmith

Some capable consultants avoid open bids because the costs of proposing tend to be high in comparison to the chances of being selected.

Most people rely on word of mouth to find a consultant. Be prepared to do some legwork to find candidates. Contact business people who are likely to know of consultants to fill your role: hardware and software vendors, other companies in your line of business, bankers, accountants, other consultants, professors and professional organizations.

You are going to rely upon your consultant, so choose carefully. Meet them and check on them. You must have confidence that your consultant can fill the role you have defined. Your consultant must have credibility, which comes from a combination of independence, expertise and style.

Independence means that the consultant has no stake in having any particular outcome, including the one you advocate. A vendor cannot give independent advice about a product the vendor is trying to sell you. The distinction can become blurred when some other sale may hinge upon the outcome. Can a consultant design a system and then review it impartially? Occasionally, consultants are accused of recommending a particular course of action because it will give them follow-on business.

Such abuses may occur. The best protection is close monitoring of the consulting engagement. Each assignment should stand on its own, without undue expectations for follow-on work. On the other hand, it is pointless to have a policy of refusing to give follow-on work to a consultant who has performed satisfactorily.

Remember, a truly independent consultant gives advice which not everyone likes from time to time. Do not put too much emphasis on bad references from clients who did not like the consultant's advice.

Most people think consultants should have all the answers. That is unrealistic. Besides, why bother hiring a consultant whose recommendation you already know? A consultant whose mind is already made up is no more independent than a vendor. It is far more important that the consultant knows what questions to ask.

If you are engaging a consulting firm, rather than an individual, remain conscious of the fact that consulting assignments are performed by individual workers, not by firms and not by salesmen. Be aware, too, that some firms think they can fill any consulting role just because of who they are. They cannot. Good planners often are poor implementers. Good reviewers often are poor designers.

A firm's experience with consulting projects performed by other employees of a consulting group has little relevance for you. What counts are the skills and experience of the individuals who actually will do the consulting work. Make sure you know who they will be.

Because consulting is very personalized, your consultant's style is important. You have to feel comfortable with the consultant, as does anyone who you expect the consultant to influence.

Ironically, this sometimes may mean you are hiring a firm rather than its individuals. For example, the fact that a report is from a big-name consultant may be even more important than its contents.

You pay for a big name. Often the price is not worth it. In some cases, only the big-name firms can provide the specific expertise you need. Surprisingly, though, even a big-name firm may consist mainly of experienced sales people and relatively inexperienced consulting staff members.

You may get better service and lower prices from these people after they have left the big-name organizations.

Once you have decided to select a consultant, make sure up front that both of you know exactly what is expected of each other. Don't nickel and dime over price; you will end up paying more or getting less.

Put your agreement in writing, incorporating the proposal and being sure to define deliverables, client participation, schedules, project reporting and payment as specifically as possible.

Then manage that project to make sure it happens. ■

"I think I'm going to need a consultant to make this decision."

Goldsmith is president of Go Pro Management, Inc. and senior associate with Clasby Associates, Inc. in Needham, Mass.

Update

CONSULT from UPDATE/3

handle the problem quickly?

■ What do their references have to say?

■ Have you met the specific team members who will handle your assignment?

■ Do they have the technical and interpersonal skills required to work with your group?

Before choosing a consultant, the client must have an idea of the options. Here are a few:

Big Eight accounting and audit firms. From specializing in handling corporate finances, firms such as Arthur Andersen, Coopers & Lybrand and Peat, Marwick, Mitchell & Co. found a natural segue into the data processing and information systems consulting business. Today, this market has become substantial for accounting firms, making up about 30% of billings in Arthur Andersen's case.

What these large, international firms offer is an abundance of resources. They boast that when hired, they are not just providing a single consultant but access to the massive experience and research capabilities of the entire firm. Although the lead consultant will interface with the client, he might be supervising a team of several consultants involved with the project. In addition, should a client require further expertise, the firm can call on specialists from any of the branch offices and fly them in for the project.

While independent consultants tend to specialize in certain technical areas, the bigger firms have expertise in a range of disciplines. Big Eight consultants point out that, although a client may only see one or two faces during an engagement, those consultants are spending hours discussing the problem with other experts back at the home office.

These large, established companies also provide stability. Edward Bruckstein, senior consultant with Peat Marwick in New York, points out that, unlike the case with an independent consultant, "a client knows we will be around tomorrow. The client is paying a premium for us, no doubt about it. But they are getting improved quality. Sure, we've messed up some jobs, but we stood by the client. It might have cost us twice as much to correct our mistakes, but we did it."

The accounting firms tend to be more than advisors. "We're in the design *and* installation business," notes Simon Moughamian Jr., managing partner of Arthur Andersen in Chicago. "We've always prided ourselves on the fact that we didn't just tell a client what to do; we helped them do it."

Management consulting firms with specialization in information systems. Management consulting in information systems is hot. According to the Association of Management Consulting Firms, Inc. (Acme), 62% of its member firms now offer information systems consulting, an area Acme considers among the hottest of all management consulting disciplines.

Though the Big Eight firms also take on management consulting, they generally find themselves working in concert with, rather than competing against, the management consulting companies. For Booz Allen, ADL, McKinsey & Co. and others of that type, the mandate is to match the understanding of technology with the insight into managing varied and specialized businesses.

At Booz Allen, for example, Howe points out that there is a large staff devoted to drawing up business strategies for banks, insurance companies and other financial service organizations. The technology consultants can and do draw heavily on that business expertise in their own work. The average full-time staff member at Booz Allen, he says, has three to five years of significant systems experience and most likely a master's degree from Harvard, Stanford or a comparable school.

"The client is paying for the combination of business and technology expertise," Howe says. "The challenge is to stay up on both those issues in order to help the client to a competitive advantage." According to Frank Allen, ADL "can put together a team that can understand complicated interdisciplinary problems."

The top management consulting firms also pride themselves on being at the very cutting edge of their business.

"Our people tend to have lived the problem themselves," Howe declares. "We're expensive, and we think we're good. We don't get called in to solve yesterday's set of issues."

Independent consultants. True to their name, this growing group of consultants cites the independence of working alone as the No. 1 motivator to going this route. According to

See CONSULT UPDATE/8

Gershon

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Update

Inside, outside: Where do consultants fit in?

Two of the nation's largest banks, Chase Manhattan Bank NA in New York and Security Pacific National Bank in Los Angeles, have vast computing needs and extensive DP/MIS staffs to service those needs. Over the years, both banks have made extensive use of outside consultants for everything from contract programming to strategic planning. The use of external consultants has resulted in outstanding successes

Interview

What are the key reasons for bringing in outside consultants rather than sticking with your own in-house expertise?
Singleton: There are two reasons. [One is that] you already know what you want to do, but you need that objective third party to confirm it for top management and take you off the hook.

The second reason is that you really don't know what to do. You don't have the technical expertise or the experience inside to make that decision, and you truly need the outside expert to come in, look at various alternatives and make some recommendations.

What are your recommendations for ways to make the consultant relationship a positive rather than a negative one?
Singleton: You have to manage consultants just like you would a project for your own organization. The reason consultants don't work out is often that the objective or mission is not clearly defined.

What happens is they start out with what they think is their premise for being there. You think you've given them a charter, and you don't meet weekly to confirm how well they're doing on that charter. As a result, they start to generate paper, they stir up your staff, they stir up the users, and the whole thing becomes almost counterproductive.

We spend almost as much time launching the consulting study as we do managing it because we find if we don't, it gets off to the wrong start.

Have you seen examples where people feel consultants are treading on their territory?
Singleton: Yes, no question about it. You have to sell the use of consultants. For example, you can say, 'If you don't need a consultant, what I suggest is you do that study in 90 days, which is what the consultant would have done, and, by the way, he says he can save between $2 million and $3 million, so I would expect you can save the same.'

Now, he's got a choice. Did he put his foot in his mouth by saying 'I don't need a consultant' because he now has got to deliver what the consultant would have? And if he does, you're a winner all around. If he doesn't, he may come back and say, 'I'm finding this a little harder than I thought. Let's talk about this. Let me control him, but let's bring him in.' Either way you're not forcing it.

What about ways to pay for consultants?
Singleton: I do not go for time and materials. That's like giving someone a checkbook, signing all the checks, and he puts the amounts in. I like to operate on fixed price. If it's fixed price, we are both focused in much more sharply on what I want and what he is going to give to me. If it's time and materials, the $100,000 study becomes a $300,000 study, and his comment is, 'I need another [$50,000] to finish it.' You're at his mercy.

How do you cost-justify a consultant?
Singleton: We looked in one particular case at what a planning staff cost us, and a consultant would be about 30% of what the planning staff cost. Plus, the consultant is going to deliver the product that the planning staff never delivered.

The other thing we tried to do is work out a joint venture with consultants. What I've said to them is, 'You identify the savings and you charge me time and materials for the actual cost of your people but no profit on it. What we will do is work out a sharing basis on the cost savings, and we will give you X%. If you hit the $3 million or $4 million goal, for example, it will generate [revenue] to you far in excess of what your profits would have been.'

Have consultants accepted this pay structure?
Singleton: Yes, we've had two or three of our last major consulting firms [take on] that. One identified about $10 million in savings in one area and will be sharing in that and will be making over $1 million in additional fees. But we'll be saving $10 million. Another identified about $5 million in operating costs and will get a percentage of that.

We negotiated on the percentage they'd get of the cost savings. The cost savings had to be validated by the financial controller of our corporation. So they were hard dollar savings and not soft dollars.

John Singleton

'If you hire a consultant to write your strategic plan, you are making a mistake.'

What are some of the key technical areas for which you recommend using consultants?
Singleton: Let me tell you an area I wouldn't recommend. Consultants are always coming by and saying 'let us do your strategic planning for you.' In our use of consultants, they didn't do the plan, we did the plan. All the line managers wrote the plan. The consultants acted as facilitators and consensus developers at the meetings, taking us all through the same logical steps — mission statement, strategy, goals, projects and critical constraints that might stop us from getting there.

We did all the work. Many consultants will come in and say, 'We will write the plan for you.' They are not qualified to write your plan, and if you hire a consultant to write your strategic plan, you are making a terrible mistake. It's a waste of money and time.

When would you use them?
Singleton: An area where they are effective is in telecommunications. The deregulation of AT&T has created a nightmare for most DP people. With all the changes, it is appropriate to find a person who is truly an expert in that area and can come in and show you how to take advantage of the integration of voice and data.

In the area of artificial intelligence, where there are not a lot of systems in existence and you've got somebody who has done it — not someone who talks about doing it but who has actually done it — I'd bring them in.

How do you check the credentials of a potential consultant?
Singleton: In the case of the telecom consultant, we went to the telecom companies that this particular consultant had worked with and asked how effective he was. They complained about him, how he had nitpicked and drove them nuts. And that made us feel pretty good because they meant he was hard-nosed in writing [specifications] and making telecommunications companies address those issues. The more complaints I got, the better I felt about him.

What is the best reporting mechanism?
Singleton: They should report to the line manager who is going to have to implement the recommendations. I'd manage a consultant on a daily basis if it [was] a short-term assignment, certainly no less than weekly. Reports should be made in person by the way; I don't like mailed reports. I like them to bring it in and walk through it. And I like them to have all the members of their team there so you can ask questions. I always ask if there is a minority opinion on this. If not, I ask why it isn't there. I'm a little concerned if they all think the same way.

I force the minority opinion out and then ask them to defend why they didn't select the minority opinion. That is seldom done.

How much autonomy should a consultant have?
Singleton: You can have access to my whole organization, but I want to know where and why you are going in those areas. Don't forget, the meter is running. ■

ILLUSTRATIONS BY ALAN HOPKINS

Update

as well as dismal failures. Both banks continue to depend on contributions from outsiders.

As the cumulative experiences with outside consultants have added up, both Security Pacific and Chase Manhattan have developed internal strategies for engaging and managing consultants.

The banks have taken divergent paths, however.

Security Pacific has one of the most successful DP operations in the U.S. and has done so well in servicing its users that the bank recently unveiled the Security Pacific Automation Co., a division servicing other DP users. John P. Singleton is president of the new division.

At Security Pacific, there continues to be unabated enthusiasm for using outside consultants, although with strong management and direction.

Chase Manhattan, on the other hand, has taken steps to cut down on its use of external consultants by creating an internal consulting group to handle many of the chores formerly delegated to outsiders.

Stan Schrager, vice-president and division executive of Systems Management Support, directs the internal group of 38 consultants.

According to Schrager, the group provides resources and support throughout the bank for computing needs and actually competes with outside consulting firms for work. The group has no set budget; expenses are covered by charging back costs.

Computerworld Update Editor Glenn Rifkin interviewed both Schrager and Singleton to get their respective views on when to look for outside consultants and when to stay inside.

Interview

Did the creation of an in-house consulting group stem from problems with outside consultants?
Schrager: It was a combination of things. A feeling grew that there was a need to have this capability. But to a great extent, it was created to deal with the extensive use that [Chase Manhattan Bank] was making of external consultants. The primary concern was the expense associated with an external consultant [and], also, the potential of lost confidential information. What consultants learn as part of our business, they could [potentially] turn around and sell to our competition.

Were there cases of that happening?
Schrager: Not specifically, as if it [were] a theft of service. It had to do with experiences they gained by the work they were doing for our organization. Potentially, they will build on that experience, making themselves more valuable to other clients. The concern was that the experience that they did gain could be turned around and used among our competitors.

Another issue that we were dealing with was the feeling from many Chase employees that the consultants were getting the good work, the interesting work.

So hiring outside consultants was creating internal morale problems?
Schrager: It created internal negative feelings. It also created an environment [in which] Chase employees felt that it was more attractive to be a consultant. So we lost people who in fact became either an independent consultant or consultants for consulting firms.

Using the internal consulting group, the feeling is that everybody is a Chase employee. The internal consultants are under the same pay scales and policies. People in areas that they work within don't perceive that the consultants are being treated in any special way. They are just an additional resource to that particular team because of the need for extra resources.

What are some of the other problems in bringing in outside consultants?
Schrager: One of the things we have learned over the years is that no matter how you use consultants, you should always have the management team oversee the consultant's work.

Then you are saying that total autonomy for a consultant is a bad idea?
Schrager: That's right. The feeling was that in some cases our reliance on the consultant was too much of an extreme.

So that once they left, you were left hanging, holding the bag?

Stan Schrager

'It is instinct for [consultants] to turn around and use their experience with your competition.'

Schrager: Potentially, yes. So you need to have an internal person within management to whom the consultant or consulting team reports. The other thing is to tie your internal staff to the consulting staff so there is an ability to take over when the consultant is done.

Do the consultants themselves foster this sort of independence?
Schrager: It depends. We work with so many consultants and obviously some do and others don't. Some of our consultants have been with the bank for many years. In fact, they have been with us for longer than many of our permanent employees and in some cases are the most knowledgeable about a particular area. The loss of them would be of substantial impact to the organizations that they are supporting.

Do you run into the problem in which you go through the whole consulting engagement and not get what you wanted?
Schrager: To some extent, but I think it's probably the nature of the business we are in. We have the same issues with internal people dealing with users. Continuing changes along the project's life cycle occur because the communication is not clear, or people are not making the commitment to understand what their requirements are. So I don't think it is unique to consultants.

But if it happens with a consultant it wastes a lot of money, while internally it isn't as bad?
Schrager: You could waste a lot of money internally as well. Very often it is not necessarily the consultant's fault. The line management is unwilling to make the commitment of time or resources to ensure that the requirements are stated clearly and, in fact, the objectives are measurable. I have seen money wasted on both sides.

Are outside consultants risks, in a sense, because they have access to high levels of confidential information?
Schrager: That is true, and that gets back to one of the concerns we had in general with the use of consultants. If you are talking about strategic plans, obviously these are the kind of plans that you are least likely to want to publicize to your competition. And in effect what you have done is give this outside person the future of where your organization or particular business is planning on going. I am not saying that the consultant is acting illegally or unprofessionally, but it is just a natural instinct for him to turn around and use that experience or knowledge with your competition.

Is it possible that the outside consultant may know more than your own staff?
Schrager: For some reason, and this is not only true at Chase, the outsider seems to be viewed as the expert against the internal person.

Have you run into outside sources who, in fact, were selling the emperor's new clothes?
Schrager: All the time. They say they have a good package, and there is nothing really behind the package other than a lot of the buzzwords that they've picked up from one organization to another. The biggest thing, though, is when the outside person may not know anything more; it is not that he knows any less, but he doesn't know anything more than the resources internally. But the perception is that because he is from the outside, there is something magical about what he or she has to say even though that knowledge already exists internally.

We have gone through studies in which the consultant did a good job, didn't come back with anything new because there really wasn't anything new to report, but it confirmed to the manager that what he believed to be true was, in fact, true.

Is it also difficult to acclimate an outside consultant to the corporate culture?
Schrager: It's a learning curve that you have to go through the more you use consultants. One of the reasons why some consultants have been here for so long is because they have gone through that learning curve and the area that's using them feels that it doesn't pay to get rid of them.

What are the key reasons that engagements with outside consultants have gone bad for you?
Schrager: Sometimes they were more hungry to get the assignment than they were qualified to handle it. They were thinking primarily of the income and not stepping back and truly recognizing what, in fact, they could deal with.

We have lost consultants who had a lot of knowledge about products and they left us with really no backup in terms of our own internal organization. And they have cost us a lot of money.

Update

CONSULT from UPDATE/5

Gary Stice, independent consultants generally come from one of two sources — large consulting firms and data processing or MIS shops.

After 20 years in DP, Robert Gershon, an independent consultant in Deerfield, Ill., decided to go it alone. "This is the only way to be," he says. "I'm far happier than I ever was before." Thomas O'Flaherty, principal of Information Service Strategies, Inc. of Woodridge, N.J., agrees. "I didn't want to be an MIS director all my life," he says. "I was typecast as a techie, and I didn't want to be a technical gypsy."

Although a majority of independent consultants have substantially increased their income, it comes at high price — long hours and tireless marketing. DP staff members grumble that consultants are making $75 per hour and calculate that rate out to 40-hour weeks. But few independents bill out more than 20 hours per week, and they must pay all overhead costs, including insurance. When they are sick or on vacation, no money comes in, and they must constantly market themselves.

"Financially, it is more lucrative, but you can't do it just for the money," Gershon says. "It is long hours and hard work. If you are in it just for the money, you're better off with a full-time job." Becoming an independent has other considerations. "There aren't any test paths," O'Flaherty explains. "If you can get enough customers to agree with you, you're a consultant."

Getting enough customers, of course, is the tough part. Independent consultants tend to spend nearly half their time marketing their services. The advantage they offer a client is the kind of personalized attention a large firm might lack. "We find that we compete with the Big Eight firms," Stice says. "We go in behind them to a client who is disappointed with the work they've done. It happens often."

Another advantage of the independent is price. "A Big Eight firm has to charge at least three times what we do just to break even," says O'Flaherty.

Although some independents have found lucrative niches within large Fortune 500 companies, the majority devote their energies to the small to medium-size businesses that want less expensive, more personal service. The most successful independents have focused on a specific, technical or managerial need and have built reputations around that capability.

Dean Hiller, president of D. L. Hiller & Associates in Sterling Heights, Mich., specializes in implementing office systems in small manufacturing businesses. He is heavily involved in networking and systems integration using personal computers and finds that, despite working 60- and 70-hour weeks, he still needs additional help.

For Hiller and other independents, a key function of the business is to refer work to other sources if they feel either unsuited or too overburdened to undertake it. Networks of consultants, usually connected via organizations such as the Independent Computer Consultants Association, help spread the work and the wealth around.

Research firms. These firms — International Data Corp. (IDC), Yankee Group, Dataquest, Inc. and the Gartner Group, Inc. among them — are perhaps the most visible of all consulting organizations. Pure consultants — those who do hands-on project consulting — will take umbrage at these research organizations calling themselves consultants, however. In the press, they are often identified as industry analysts, and that is perhaps a more accurate term.

These firms generally serve as vast information resources, gathering and analyzing data for clients rather than directing specific technical DP or MIS projects. According to Tim Caffrey, director of strategies for microcomputers and office systems at IDC, the difference between the research firms and the consulting firms is the way information is delivered. IDC, for example, uses its continuous information service — a telephone hotline for customers — newsletters, reports and seminars to deliver its message.

IDC customers are generally served by these options rather than by on-sight presentations, and they pay anywhere from $15,000 to

A day in the life of a consultant

Ulrich is president of Walter Ulrich Consulting, a management and technology consulting firm in Houston. Computerworld *Update asked him to describe a typical day in the life of a consultant. As Ulrich points out, "Except for the 'administrivia,' it's a very realistic depiction of what I do."*

By Walter Ulrich
Special to CW‡

The car glides into a parking spot at 7:40 a.m. Five minutes later I am having breakfast with a senior telecommunications analyst for a large conglomerate where we discuss their corporate telecommunications strategy. At this meeting, I am learning about the needs of some of the smaller divisions.

At 9:00 a.m., we arrive for the meeting of the office automation steering committee. The steering committee is made up of senior managers from the telecommunications, information systems and office services departments. The committee's name is too narrow: It is actually addressing strategic technology issues.

The corporation's decentralized management style and its implications for technology are the subject of a spirited debate. This group is well attuned to corporate goals, and several technical premises are agreed upon.

A progress report for an OA pilot test is given. One of the steering committee members has received a commitment from a leading vendor to provide a system for the test at no charge. The test is only loosely organized. I suggest that the test be deferred and reorganized to maximize its value. We also agree to select a population for the test that will not be alienated when the test is concluded.

Next, we evaluate alternatives for the corporate voice communications network. Everyone recognizes the need to integrate voice, data and message systems. Along with digital switches, a #5ESS AT&T network switch is being proposed, and its configuration for this client is very attractive. At the end of the discussion, the group moves closer to a consensus on the merits of the various alternatives.

For a small investment, we can help him identify pockets of savings. If we find some significant savings, he looks like a hero.

The meeting breaks up just before noon.

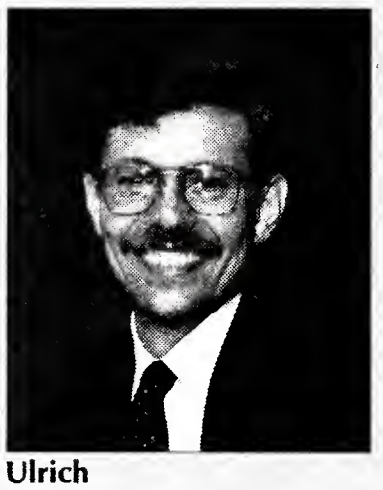
I have lunch with an MIS executive for one of Houston's large energy companies at his club. The energy industry is in a lull, and he relates how, with very modest increases in expenses, he is helping his divisions cut costs and increase profits.

I suggest to him that he consider a cost-containment study, similar to one we did for a client in Pennsylvania. For a small investment, we can help him identify pockets of savings. If we find some significant savings, he looks like a hero. If we do not find any savings, then he can truly say he has done everything possible to reduce costs. He likes the idea and asks to discuss it further.

I drive to my office where I return some phone calls. A client in the transportation industry asks about the impact of electronic document distribution on the transportation business.

The next call I return is to a member of the press. The news editor of a trade publication is asking about my reaction to a new product. This is a frequent obligation of a consultant. Press releases always sound great, but the claims about this product are unrealistic. I frankly discuss my reservations and also underscore those parts of the announcement that are innovative and noteworthy.

I return two calls to companies that are potential clients of ours. Neither party is in, and I leave messages for them to call me back. I've been playing telephone tag with one of them for so long that the price/performance of computers has improved by 50%, and three more major industry vendors have announced cutbacks and layoffs since the last time I spoke with him. My administrative assistant reminds me that it is time for an analysis session.


Ulrich

We are developing an information strategy for a large professional services firm. The requirements analysis has been completed, and today we will begin developing technological approaches to meeting those requirements.

The project manager begins with a brief review of the results of the data collection. The participants have already reviewed the data, and an excellent discussion ensues about the business implications for the client.

The project manager lays out several technological scenarios that might fit this particular client's situation. Then, the organized free-for-all begins.

Old alternatives are challenged and new alternatives are added. Two approaches evolve, both of which satisfy all the project objectives, and the meeting adjourns. The project manager will develop both cost and performance models for each solution and for a hybrid solution.

I have time to return a few telephone calls before I have to leave for a flight to the West Coast. The first call is to an old friend whom we are trying to assist with a telephone system solution.

My friend, who is an MIS executive for a large company, has recently become responsible for telecommunications. He must replace the firm's seven-year-old private branch exchange, because they have simply outgrown it. They will be procuring a $1 million digital switch that will have to serve their voice and some of their data needs for the remainder of the decade.

My friend tells me that his company is going to write a request for proposals and procure the switch using internal resources. He has 25 years of DP experience himself, he says, and with their large in-house staff they simply cannot justify the expense of a consultant. I good-naturedly accept his decision and tell him to call if I can be of any help later on.

The other calls are more positive. A major U.S. port commissions us to assist it with upgrading its computer approach.

The president of a well-known and successful construction firm asks if we can help his company put together a strategic technology plan.

It's already after 5 p.m., and I am stuffing everything on my desk into my briefcase so I can head off to the airport. ■

Update

$20,000 per year for their subscriptions. "We get calls about anything you can imagine — software evaluation, optical disks, micro networks, technical assessments, vendor viability and particularly what other users are doing," Caffrey says.

Despite the distinction between the research firms and other consulting outlets, the bottom line is generally the same. "We help people maximize the return on their investment in technology," Caffrey says.

Aside from all of these consulting options, the DP or MIS manager has still more from which to choose. The vendors themselves offer both hardware and software consulting on their specific products, and data processing service houses provide contract programming for firms seeking impermanent solutions to their staffing problems.

Organizations serving as consulting middlemen are also springing up as the need for high-tech consultants proliferates. Technology Transfer Institute of Santa Monica, Calif., is a seminar bureau representing such top names as James Martin, Amy Wohl, John McQuillan and Harry Newton. The firm recently began offering consulting services, matching its noted speakers with clients seeking specific strategic advice.

Many large DP shops find themselves bringing in former employees who have become consultants. Cordes of Raymond Kaiser Engineers has done so with success. "We've had no problems bringing someone back in. We know their true talent, and they can get the job done without being hired permanently," he says.

At DEC, former full-time employees regularly return as consultants to work on a contract basis. As a vendor, DEC has unique problems in both hardware and software development and finds it beneficial to bring in ex-employees who understand the problems. "We have employees who quit on Friday and come back as a consultant on Monday," says Noel Negroni, manager of software and consulting acquisition. "It's a way to retain highly qualified people who would rather not work full-time at one company."

Setting the rules

"When the client doesn't manage the consultant, the consultant ends up managing the client," Hammer warns. It is a tenet upon which consultants and savvy users agree. Finding the consultant is just the first step. Establishing a set of ground rules both parties agree to is the next essential directive.

Though clients generally understand that they have a problem that needs to be solved, consultants are often surprised to find that no clear definition or direction has been established to do the job. "It has been my experience that the value a client receives from a project is very strongly correlated with how effectively they manage the project," Hammer says.

It becomes incumbent upon the consultant, therefore, to do serious preplanning with the client to avoid misunderstandings and disasters down the road. "Most projects fail either because of incompetence on the part of the consultant or not doing enough client interface work prior to starting," according to Dean Hiller. Hiller says that the absolute prerequisites for any consulting job include the following:

- A good proposal with clearly stated objectives — in other words, what are the deliverables?
- A definitive work plan.
- Enough preproposal work with clients to ensure that they are properly oriented to the time frame and cost of the project.

Hammer

The large accounting firms tend to formalize the procedure to a greater degree than independents, although all successful consultants insist on clear, upfront guidelines. Allen Sneider, a partner at the Boston office of Laventhol & Horwath, explains that for extensive projects, his group creates an engagement letter. This letter defines the services, explains the charges and provides an estimate of fees. The project is done in phases with an initial feasibility study followed by implementation and maintenance procedures.

"When you are dealing with microcomputers, the consulting fees could cost more than the system," Sneider points out. "Therefore the service must be superefficient. Consulting has a high value, but it may be intangible, and some clients may wonder if it's worth it. That requires a lot of education."

As the price of hardware drops and consultants' salaries rise, it will not be unusual for consulting to cost as much, if not more, than systems, according to Sneider. "You have 32-

See CONSULT UPDATE/11

LASER WARS

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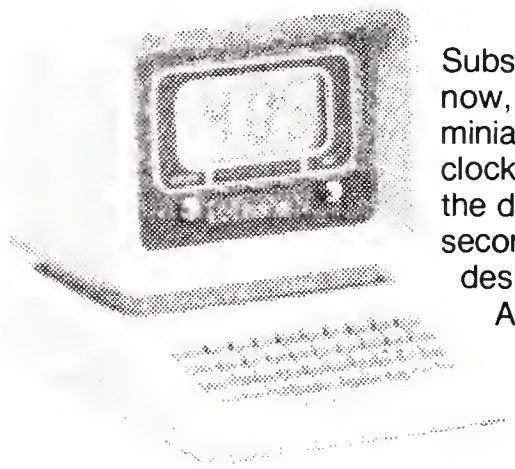

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Update

Keeping up with technology: the ongoing challenge

Consultants tend to speak with an air of authority. Pronouncements about the latest trends in software and hardware, systems integration, office automation, telecommunications and AT&T Unix are made with the utmost confidence. But clients may wonder: How do the consultants know so much?

Staying abreast of technology is a full-time job. Being able to sift through all of the vendor hype and real user needs makes that job even tougher.

"Some consulting firms like to generate an idea and build it up as the most important thing since sliced bread," Michael Hammer says. "They then convince the client base that they desperately need service in that area, and only that firm is equipped to give that service."

Hammer often finds himself debunking the hype. "This is an industry and a business with an awful lot of hype, and everybody is in a fight to find the latest massive revolution. If there isn't one to be found, people manufacture one. And I find myself spending a lot of time leavening that hype with reality," he says.

So for the clients, it is "caveat emptor." Consultants often speak of the difficulties of convincing clients that they need assistance in one discipline or another.

That is true in some cases and not in others. Clients should solicit several opinions before contracting for help.

Consultants agree virtually across the board with Frank Allen of Arthur D. Little, Inc. who says that staying up with technology is the most difficult task they face. Both independents and those in large firms put in countless hours reading trade journals, magazines, newspapers, attending trade shows and seminars and interacting with vendors. The large firms have the advantage of housing research staffs responsible for finding and circulating pertinent data to individuals on the staff.

William Inmon, a consultant with Coopers & Lybrand in Denver, explains that his firm uses "rabbit multiplication." A consultant who wants to learn a system sits with a qualified person at a job site, and on the next assignment two will sit with that person.

'We don't have all the answers. The industry hasn't matured sufficiently to the point where all the answers exist.'

— Edward Bruckstein
Peat, Marwick, Mitchell & Co.

This method expands to fit in all those who want to learn. Still, there is often not enough talent to meet the demand.

At Arthur Andersen & Co., the method is to hire raw talent off the campuses and then train the new recruits intensively for the first five years. That training, combined with hands-on experience and in-house-developed tools, "fills in the cracks," according to Arthur Andersen's Simon Moughamian Jr.

"We know the clients are paying a premium for us, so we have to stay at least three steps ahead of them," adds Peat, Marwick, Mitchell & Co.'s Edward Bruckstein. "There's nothing more embarrassing than a client saying he saw something that I didn't."

Bruckstein points out that Peat Marwick actually creates leading-edge systems internally — using themselves as guinea pigs — to be able to stay ahead of clients' needs.

For the independents, the task is harder. Dean Hiller of D. L. Hiller Associates, spends eight hours per week reading 20 industry periodicals. He also gives seminars around the country on various technology-related subjects. The best experience, of course, is hands on, and successful engagements, more than any research, serve as the best learning tools.

More important, an independent must know when to back off an assignment. "Honesty has to come first," says Gary Stice, a Tulsa, Okla., independent. "If a client is looking for a service that I'm not comfortable with, I'll say so. If I can't make them happy, I won't take it. When you're an independent, you can't afford one unhappy client."

In that vein, the independent consultants, through associations and word of mouth, refer clients to others with strong expertise in a given area. This networking has its own rewards. "I may not get any profit," Stice notes, "but many times I'll get called back later. Being held as an information source is extremely important."

Nonetheless, in a business characterized by massive and continuous change, no single source can claim to have all the answers. Users hearing that claim should be forewarned.

"We don't have all the answers," Bruckstein says. "The industry hasn't matured sufficiently to the point where all the answers exist." ■

CONSULT from UPDATE/9

bit machines with powerful programs sitting on the desktop and they have the same capabilities as a supermini," he says. "It can be pretty dangerous to put a 32-bit supermicro on your desk unless you have some competent consulting along with it."

Consultants traditionally charge by the hour for time, and materials and rates vary. Lesser known independents generally charge anywhere from $40 to $150 per hour while the superstars can command fees up to $5,000 per day. The big firms generally charge an hourly rate — usually from $75 to $200 per hour — based on the experience of the consultant assigned to the task. Generally, the more inexperienced the consultant, the cheaper the rate.

At Peat Marwick, work is done on a fixed-fee basis. "An hourly charge makes the client feel uncomfortable," according to Bruckstein of Peat Marwick. "Whenever they call or stop you in the hall, they feel the clock is ticking." Clients rarely specify a price level when contracting with companies that charge by the hour. At Arthur Andersen, a client with an ongoing relationship might request a specific consultant to be assigned to the task, but generally the firm decides who to send based on the needs of the project. "Very seldom does anyone say, 'Give me a $125-per-hour person or [a] $175-per-hour person,' " Arthur Andersen's Moughamian notes. "We're delivering a product, a service, to them.

Adds Michael E. Simon, managing director of planning at Arthur Andersen, "There are two kinds of buyers. There are buyers who are really body shopping. They need a systems programmer and they go out and get one based on hourly rate and qualifications.

"The other kind of buyer is seeking risk aversion. If [he] selects the right consultant, there is a much higher chance of getting a system that really meets their needs. That person is buying project management and generally won't question what we feel is the right mix of people."

Some large firms that use consultants extensively have set up consulting acquisition centers to act as brokers between consultants and clients. At DEC, Negroni points out that thousands of consultants are under contract at any one time and all must be approved by his office.

In acting as a broker between the consultant and the DEC manager, Negroni can facilitate a smoother interaction for both sides. "By brokering these issues, we can reveal a lot of the problems that otherwise would stop us from getting the most out of the engagement," Negroni says.

Though cost may well be a crucial issue for smaller organizations, most medium to large users are less concerned with the final bill than they are with solving the problem. "Price is not even discussed," according to David Geary, director of corporate MIS for Kaiser Aluminum & Chemical Corp. in San Francisco. "Expertise is the issue."

"Trying to manage consultants by cost won't work," Negroni adds. "Once you need a consultant, you need him now."

Communications

Nonetheless, clients want to feel that they are getting their money's worth. Once a project is under way, constant communication is essential. "Communication with the client is critical," says Roger Birks, an independent software consultant in Phoenix. "You should bring screens and reports, prototypes of what you are doing, to regular meetings. It gives the client a chance to see and touch the project as it is going along. When the people managing the project are involved, you tend to get a more successful implementation."

Status reports, weekly or monthly meetings and constant two-way communication serves more than just a single purpose. For the client, it is a way to monitor progress and value. According to Scott of Dart & Kraft, the good consultants are often stretched to the limit keeping up with all their clients.

"Consultants tend to try to balance jobs, and you must make sure your job gets the attention it deserves," Scott declares. "By making sure they get to meetings and make deadlines, you will get their full attention. Also, it's a good way for irritating problems to surface. Consultants are always happy to respond because you might end up as [a] reference for them later."

For the consultant, it provides not only a chance to command client interaction, but an opportunity to disagree. Booz Allen's Howe points out that when asked for their best judg-

See CONSULT UPDATE/14

TOP 30 MANAGEMENT CONSULTING FIRMS
(Annual Revenue)

More than $100 million	More than $25 million	
Arthur Andersen & Co.	Ernst & Whinney	Science Management Corp.
Booz, Allen & Hamilton, Inc.	Coopers & Lybrand	A.S. Hansen, Inc.
McKinsey & Co.	American Management Systems, Co.	Bain & Co.
Arthur D. Little, Inc.	Hay Group	Deloitte Haskins & Sells
Towers, Perrin, Forster & Crosby, Inc.	Reliance Consulting Group	Meidinger & Associates, Inc.
William M. Mercer, Inc.	Price Waterhouse & Co.	Laventhol & Horwath
Peat, Marwick, Mitchell & Co.	Hewitt Associates	Temple, Barker & Sloane, Inc.
	Boston Consulting Group, Inc.	Kurt Salmon Associates, Inc.
	Stanford Research Institute International, Inc.	Harbridge House, Inc.
	Touche Ross & Co.	Kwasha-Lipton
	Arthur Young & Co.	Management Analysis Center
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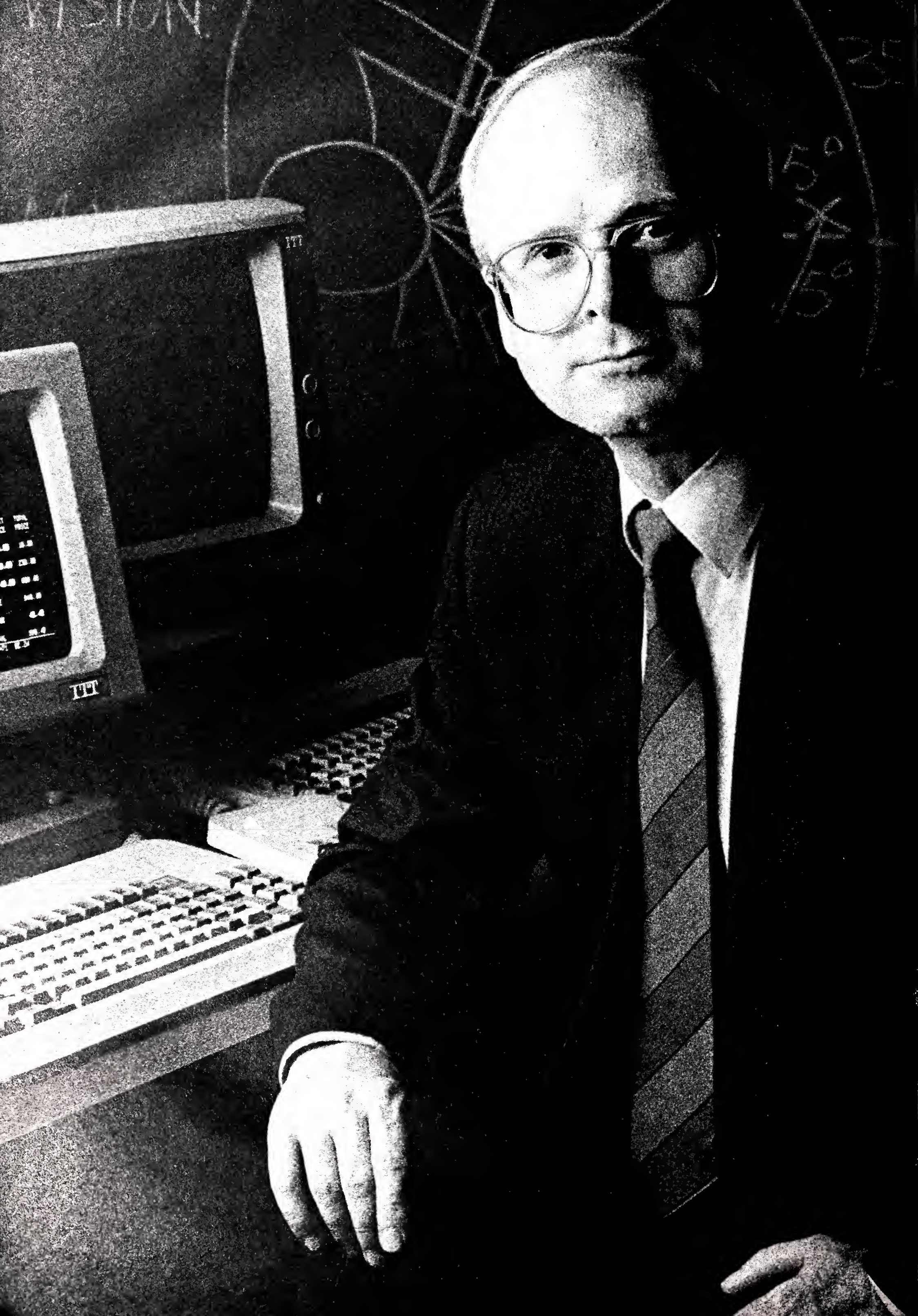
Source: Temple, Barker & Sloane, Inc.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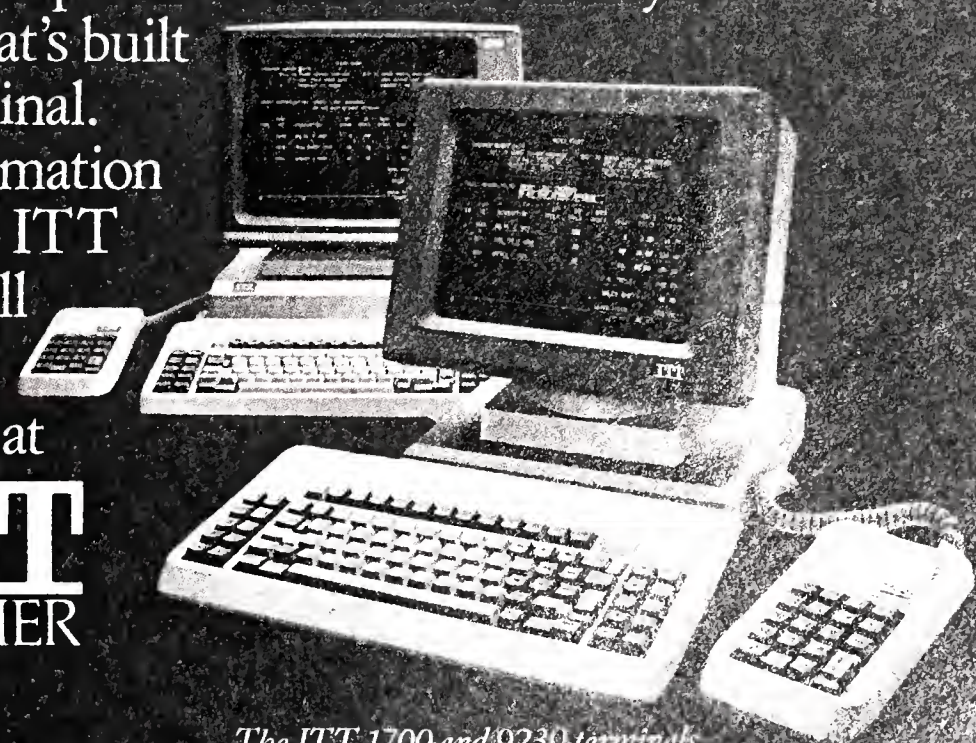

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Update

Stice

'It's not [a consultant's] job to be a personnel administrator, but a lot of times you have to do that. The best way is to have one person to report to. You can't make six people happy.'

— Gary Stice
Independent consultant

CONSULT from UPDATE/11

ment, consultants many times will disagree with their clients on fundamental issues. "On every assignment there are going to be three kinds of issues: those in which the client agrees with us, those in which we disagree but over time come to an agreement and those we just agree to disagree on."

The forum of regular meetings allows those issues to surface throughout the project rather than lurking beneath the surface until it is too late to address them.

"Communicating means not only keeping up to date on absolute progress but also where you are on issues and viewpoints. It's an absolute disaster to go into the final meeting and surprise the client with a series of recommendations or conclusions that he hasn't had any insight into before," Howe says.

Pitfalls

Despite the best intentions, consulting engagements occasionally can and do run into problems. Successful consultants limit the number of pitfalls encountered by up-front planning. But even the most carefully outlined plan can run into snags.

Internal politics are often a major stumbling block to successful engagements. A consultant may be brought in by a manager who does not have high enough ranking to set plans in motion. Conversely, the consultant may find that the best people to provide input into a project may not have access to it simply because they are too low on the totem pole.

"It's frustrating when people who need to be involved in the decision-making process can't be due to the political realities," consultant Stice explains. "The best person to explain a problem may be a third-shift machine operator, but he may never get access to management."

"You need to interface with those who will use the system and get input as to what really happens in that setting," adds Richard Jacobsen, an independent consultant from Bloomington, Minn.

As mentioned earlier, there is often resentment from internal staff members as to what they perceive as the intrusion of a consultant. Top management will often ignore advice from internal staff members and welcome the same advice if it comes from an outside authority. They believe, as Hammer says, that an outsider is not subject to the same conflicts and political issues that color the thinking of the internal staff.

This prejudice puts consultants in an awkward position. The in-house staff may become uncooperative and resist consultants, making their job difficult if not impossible. "It's a very delicate situation," Stice says. "It's not your job to be a personnel administrator, but a lot of times you have to do that. The best way is to have one person to report to. You can't make six people happy."

Users have recognized this pitfall and have looked for creative ways to circumvent it. Coca Cola's Harris says that the DP/MIS director must try to explain to the staff candidly that the proper level of expertise is not available within the staff.

Others suggest bringing key personnel in on the engagement and letting a lower level supervisor oversee the consultant's work.

Consultants all have felt the frustration of reaching what they feel is the perfect solution only to have the client reject it. At the other extreme, consultants must avoid overdesigning a system that clients are unable to run once left alone. Some of the Big Eight accounting firms have been accused of this practice by government clients. They will reportedly design a system and then send their own high-priced talent to run it.

"It's one thing to be correct and another to be correct and impractical," Booz Allen's Howe states.

Although it has not become a common occurrence, clients must also watch to make sure consultants are

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Update

So you want to be a consultant?

By Alan R. Simon
Special to CW‡

One of the results of the personal computer explosion is the potential for DP experts, college students and professionals from many career fields to enter the world of computer consulting. The projected shortage of qualified computer programmers and trainers, accompanied by increasing automation of small businesses and organizations that would not have thought of computerization 10 years ago, has provided the growth in the computer consulting profession.

From where do the consultants come? Three of the primary sources are the following:

- DP professionals who leave their existing companies for a variety of reasons, such as lack of advancement potential or a desire to create and run their own businesses.
- Computer-savvy individuals wishing to switch careers because of burnout or just a desire to try something new. Many computer consultants were once teachers, accountants, attorneys or doctors, and they became familiar with personal computers through their former professions or as a hobby. The ever-decreasing cost of hardware has allowed modest investments to become building blocks to a new career.
- Part-time workers wishing to earn extra money by programming for others or, in some cases, wanting to build a successful practice with a minimum of risk.

Whether working full time or part time, anyone can designate himself a computer consultant. Unlike the legal or medical professions, there is currently no licensing agency or organization to ensure competence or oversee the profession.

A successful independent consultant functions as chief executive officer, vice-president of marketing, chief accountant, the entire sales staff and the software development section.

It is another matter, however, for computer consultants to stay in business. It takes more than business cards and letterhead to plan, organize and develop a successful practice. Successful consultants must be technically adept at their specialties, such as data base programming or accounting software. Just as important as technical skills, however, are the business skills they must use to build and manage consulting practices. A successful independent consultant functions as chief executive officer, vice-president of marketing, chief accountant, the entire sales staff and the software development section all rolled into one.

Consultants must also be able to relate to people. Before they can embark on a series of contract programming assignments, consultants must be able to sell technical competence and integrity to the prospective client. Communications skills are extremely important because of the requirement of generating proposals, correspondence and documentation, among other written documents. Consultants wishing to conduct seminars must be able to speak confidently and effectively.

Additionally, computer consultants should be able to handle setback after setback and bounce right back. Every consultant will eventually face negotiation breakdowns, project cancellations and client decisions to use someone else's services. A consultant must be able to set aside these disappointments and trudge on toward the next project.

An important tool for any executive, especially an independent consultant, is networking, or building business through personal and professional contacts. One of the major attractions of computer consulting is the ease of setting up a business operation without massive infusions of venture capital or bank loans. Word-of-mouth references are among the most effective means of attracting clients.

After establishing a practice, a computer consultant faces a variety of concerns. One of the most important concerns is keeping up with technology. One look at the local bookstore's computer magazine section with headlines such as "Seven new spreadsheets for the Apple Computer, Inc. Macintosh" will convince any consultant that he cannot afford to fall behind the technology of the times.

Since the marketplace is so saturated with books, periodicals, seminars and many other means of learning, a consultant must choose the mix of media to maximize learning.

Like any business people, computer consultants constantly need to gauge the necessity of making changes in many different areas: product and service mixes, the intended target markets, the form of business operation — sole proprietorship vs. corporation, for example — and the size of the firm. A consultant might also decide to switch from part-time to full-time practice or leave full-time independent operations to join an existing consulting firm.

Naturally, not all beginning consultants will succeed at their new occupation. For those that do, however, the rewards and benefits of computer consulting can be well worth the effort required. ■

Simon is managing partner of Computer Education and Consulting, a Colorado Springs consulting and software firm. He is the author of How to be a Successful Computer Consultant *published by McGraw-Hill, Inc.*

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not sharing proprietary information with others. Many corporations require consultants to sign nondisclosure contracts to legally bind them. Elaine Bond, director of DP at Chase Manhattan Bank, has seen instances of a consultant taking knowledge to a competitor. "You can try to bind them legally, but it is a difficult administrative problem. It causes you the extra burden of managing proprietary information."

Sharing secrets, however, is self-defeating for a consultant. "Once they do it, they won't work again," DEC's Negroni says. "My impression is they don't share information."

Clients should also watch for consultants with packaged software solutions to sell. Users such as William F. Monteith, MIS director at Armco, Inc. in Middletown, Ohio, have seen consultants proceed through an entire engagement, only to unveil a packaged solution that could have been offered at the outset.

"These people have software packages on the shelf, and their recommendations are biased by that material," Monteith says. "We tend to exclude consultants with a package to sell." DP/MIS managers are cautioned to question a potential consultant up front about biases toward packaged solutions.

And finally, finding consultants who know as much as they claim to know is no simple task. In the complicated, unresolved disciplines such as telecommunications, systems integration and micro-to-mainframe links, "There are very few people who know what's going on," Raymond Kaiser Engineers' Cordes says.

"We needed help with a computer-integrated manufacturing system [CIM], and we've talked to a few consultants who claimed to know CIM," adds Geary of Kaiser Aluminum. "During the interviewing process, it was clear they didn't know any more than we did."

The difference between true and imagined expertise is also apparent in strategic consulting. Management consulting firms boast of helping create a competitive edge through information systems, but that is easier said than done.

"There aren't too many consulting firms that are very good at providing a competitive edge," Harris says. "They may say they are doing that, but most aren't. With the exception of the financial services industry, very few businesses are making any significant use of computer systems to gain a competitive edge."

Users, therefore, must seek out organizations similar to their own and find instances of successful consulting engagements. These samples and resulting references can make a substantial difference between satisfaction and frustration.

Future trends

Consultants agree that in the next few years, the technical issues will become less important as organizations focus on gaining a competitive edge using technology. Clients, ADL's Allen points out, are becoming more self-sufficient.

"In 20 years, you won't hire a consultant to help implement a decision support system," Allen says. "That will be a commodity item. Consultants will be called upon to educate people on how to manage information-intensive corporations."

In the near future, however, consultants face a stiff challenge. They must stay abreast of changing technology while facing increased and tougher competition. As the consulting ranks continue to expand, the good jobs will be harder to find.

Though the large firms continue to enjoy plenty of engagements, the field has changed subtly in recent years. Marketing has become critical to both large firms and independents as users grow more savvy about their needs.

"In the early days, marketing was sitting one foot closer to the phone than the other guy," Broadview Associates' Poppel says. "But the days of waiting for the phone to ring are well past. Marketing is not just getting yourself chosen from a group of competitors; it is often getting the prospect to understand they have a need."

According to Moughamian of Arthur Andersen, the business is getting more complicated. Now that sophisticated customers have installed personal computers, local-area networks, operating software and telecommunications equipment, they want not only to tie it all together but also a single vendor to do that for them.

"It's a complicated world," Moughamian says. "Your competitor one day may be your partner the next."

Consultants also believe that there will be no letup in technological change, and, therefore, work should continue to be plentiful.

"If the rapid pace of change keeps up, I expect the consulting business to thrive," Hammer says. "Personally, I see no end to the change in sight. All the reports of a slowdown in the computer industry are temporary and do not reflect the end of the party.

"If you look at the the world from 40,000 feet, the impact of information technology on U.S. business has been almost insignificant thus far," Hammer continues. The impact has been minor compared to what we are going to see. Companies don't do business in a markedly different way than before computers because of computers. But that's about to change. And consultants who do a good job will continue to have important markets."

Perspective, as Howe of Booz Allen points out, is crucial to any consultant-client relationship. "A consultant can shed light on issues, provide objectivity, expertise, analysis, be a catalyst and motivator," he says. "But consulting is not a panacea to all problems." ■

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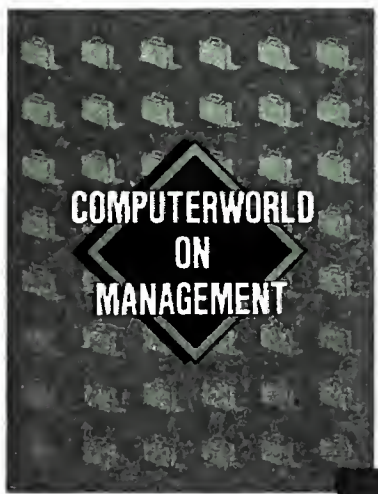

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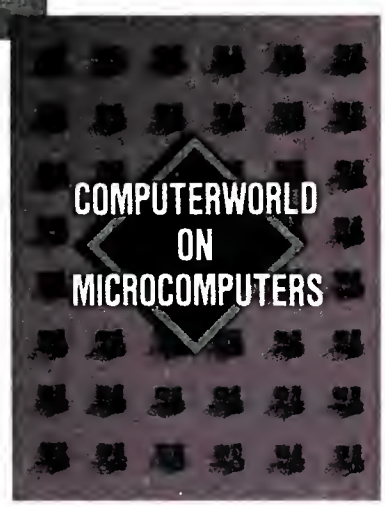

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50. Business Service (except DP)
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65. Public Utility/Communication Systems/Transportation
70. Mining/Construction/Petroleum/Refining
75. Other User _____ (Please specify)

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85. Computer Service Bureau/Software/Planning/Consulting
90. Computer Peripheral Dealer/Distributor/Retailer
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IN DEPTH

White-collar computing: The professional as artist

By David Stevens

In the long run, the dramatic change brought on by office automation won't be in worker productivity but rather will be in working style — the "artistification" of the white-collar professional.

Most articles exploring the effects of automation on white-collar work fall into one of two classes: paeans to productivity or bleak visions of the physical and mental consequences of various forms of "technostress." So far, scant attention has been given to how the computer-assisted personal workstation can be expected to change the fundamental nature of white-collar work.

There are two kinds of change that computers can effect in the professional workplace. They can speed the processing of work in the traditional style, and they can enable fundamentally new styles of work to emerge.

One of the primary traditional office tasks is the transcription of a professional's ideas and preliminary drafts from one medium onto another. Much of the discussion of the increased productivity of the automated office centers on the ease and speed with which these transcriptions can be accomplished with the aid of a computer. Impressive as these improvements are, they are almost certain in the long run to be less dramatic than the changes in working style that can collectively be called the "artistification" of the professional.

The artistic nature of the pure programmer has an honored place in the folklore of the sociology of computing. This artistic make-up is supported by the nocturnal habits, eccentric behavior and declasse attire and coiffure of the stereotypical specimen of *homo programmaticus,* even if

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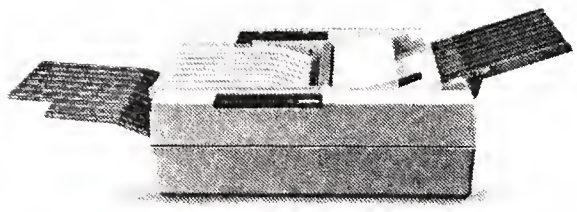

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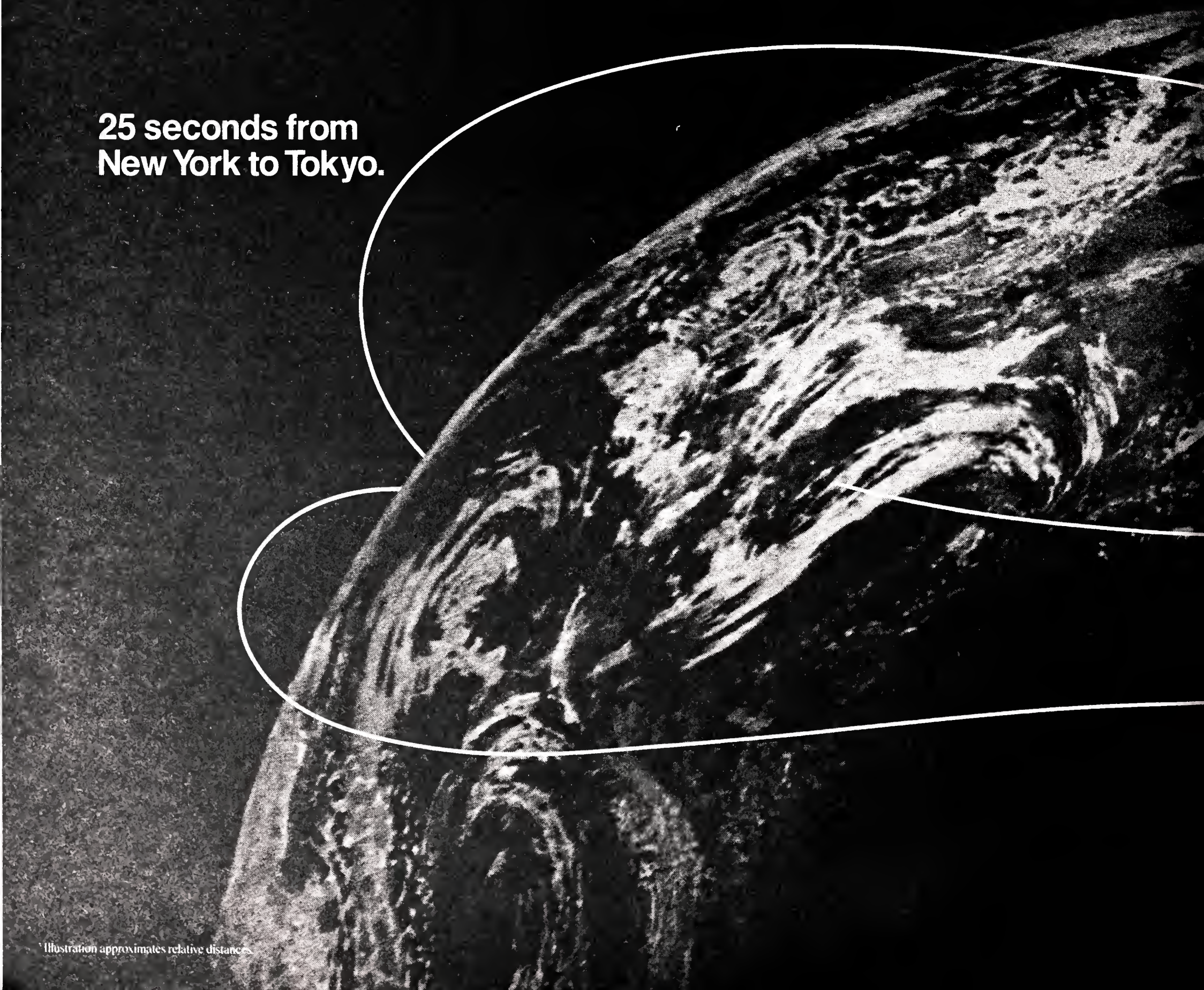

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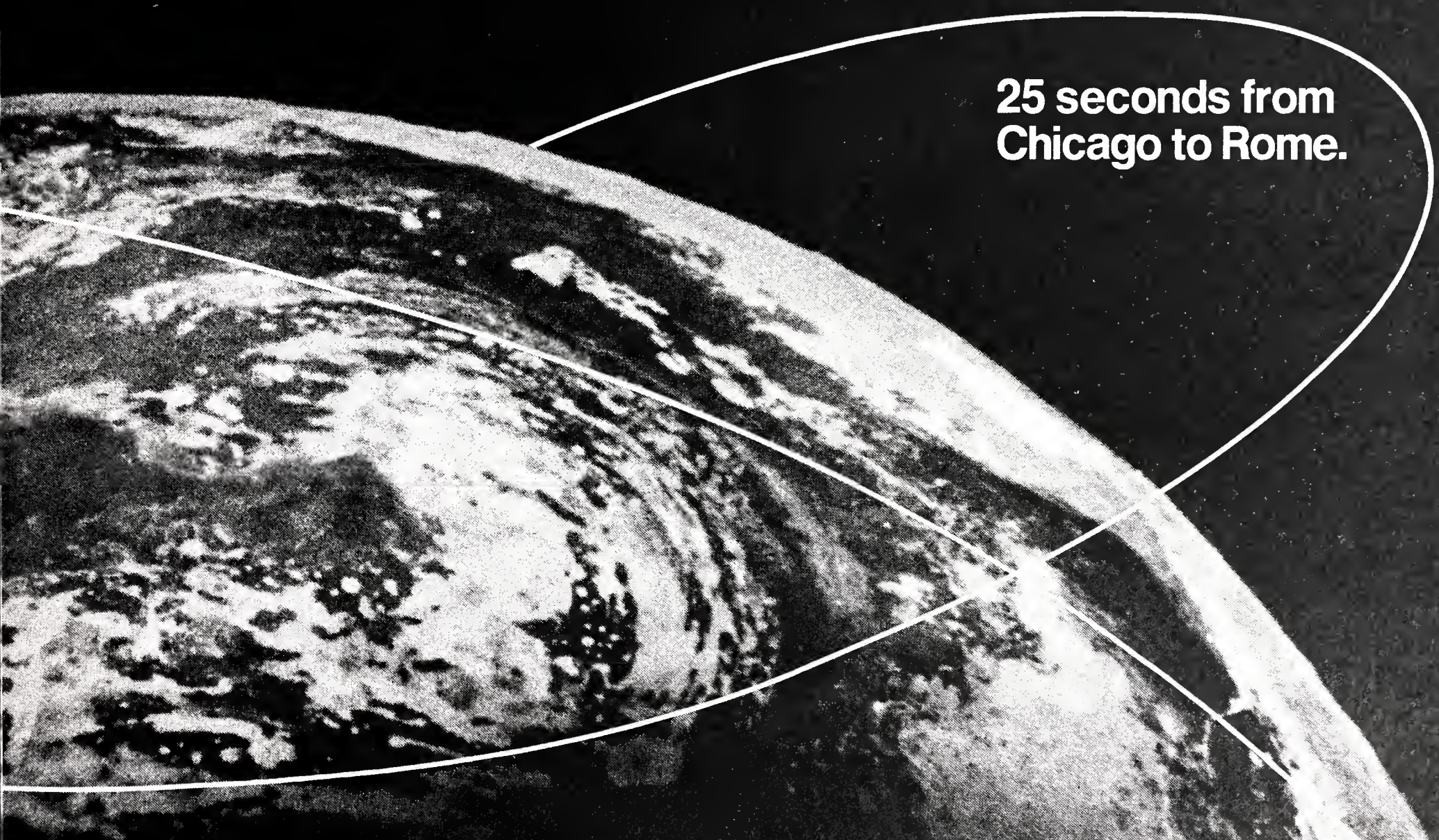

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it is not always evident in the beauty of his work product.

Computing work is generally assumed to attract such people. While this observation is true, it is not the whole story; there is also a sense in which it can be said that computing work creates such people.

A treasure chest of skills

The artistic urge has remained latent in many of us because we have lacked the skills necessary to express it. The personal computer is putting a treasure chest of those skills, and thus the ability to express ourselves, onto every professional desktop.

With the ability to express ourselves more freely will come the desire to create; with the desire (and a little secret practice) will come the exercise of this new capability. And with its exercise will come some elements of the artistic temperament.

As a result, the regular use of a personal computer-assisted workstation will convert the professional work force into a quasi-artistic work force. To some extent, this change will be the rather obvious result of the professionalization of certain design-oriented functions. To a greater extent, however, the change will be the result of the largely unanticipated artistification of the hitherto routine and pedestrian aspects of professional life.

Changing techniques

It used to be, for instance, that a professional would dictate or handscrawl the text of a document in preparation, describe any artwork to be included with the text and hand the resulting bundle off to a set of artisans for conversion into a readable whole.

This same professional, with the assistance of a computer, can now do his own document layout, including type fonts, faces and sizes. He can also execute his own artwork, ranging from simple line drawings through sophisticated graphs and charts to bit-mapped halftones of considerable complexity, all of which can be enhanced by automatic curve smoothing, line straightening, shading and texturing and other handwork-enhancing utilities.

This new breed of artistic professional will need as much management as did his preartistic predecessors. But because of his burgeoning artistic temperament, he will tend differently to conventional management practices and techniques. These changes should make the next few years interesting.

Freedom of expression vs. consistency of format. One characteristic of the artist is his desire to express his own individuality. In the professional workplace, this tendency will surface as an inability to leave any document alone.

In the old days, the difficulty of the mechanics often served to govern the urge to change things. Suggested alterations were generally local and limited in scope; sweeping changes were rare. Technology has made total reorganizations of large documents quite manageable and has provided every professional with the means to play with the appearance of a document.

The forms explosion that follows the introduction of the personal computer into almost any office is a wonderful example of this effect at work. Almost the first thing that the professional now does to demonstrate his newfound prowess is to create a new form, even though the old form is adequate and there are plenty of them left.

The precomputer professional developed the content of a document but generally left the establishment of its form and appearance to his administrative and clerical staff.

One result of this arrangement was that the semiliterate phrases penned by the brillant but grammarless professional could be turned into polished prose before being released. Another was that all documents originating from an office exhibited a common look, regardless of the personal idiosyncracies of the several professionals served.

In some cases, this common look extended beyond the department to encompass the whole organization, providing a central part of the corporate culture and personality. A person receiving such a document could tell at a glance its place of origin and, in the case of a long document, could quickly develop a fairly accurate feeling for how it would be organized.

Professionals are now free to indulge their own whimsies as to how their letters and memos should be formatted. They can create their own letterheads and forms, even incorporating their own logos should they so desire.

What the individual gains in freedom of expression, the organization loses in consistency of output appearance and style. For those situations in which flair, panache and a touch of poetry are appropriate, the organization's loss is the writer's gain; where regularity and uniformity are important, the writer's artistic license can generate confusion for the reader.

Total control vs. lost thoughts. One of the most frustrating things a writer can experience is dropped thought: He begins a sentence or paragraph, knowing the point he wishes to make, only to have it fade out of existence before he has captured it on paper. Sometimes he can recapture the mental context and the thought, sometimes not. In either case, the flow of thought is disrupted and the compositional task does not go smoothly.

In the precomputer days, the professional used the pencil as his primary recording device. With all its limitations, the pencil provided a comfortable and fairly rapid means of converting thoughts to text, so that relatively little thought had to

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be devoted to the mechanics of the process.

The "artistified" professional, on the other hand, has assumed total responsibility for the appearance as well as the content of his document and can access a substantial armory of sophisticated tools that enable him to achieve the effects he desires.

He now has more options than in the pencil days — for example, he can use italics, boldface or underlining for emphasis instead of only underlining. However, the mechanics for invoking them are necessarily more complicated. Involvement with complicated mechanics is a substantial barrier to continuity of thought.

Immersion vs. insulation. The precomputer professional was insulated from the tedious mechanics of refining his work into publishable form. His handwritten drafts were transformed into type by the clerical staff. His hastily plotted graphs were redrawn neatly and to scale by the drafting department. His sketches blossomed into finished artwork under the hands of the technical illustrators. His cost distributions and spreadsheets were prepared by the accounting department.

When all of the pieces were satisfactorily assembled, he had only to review them for accuracy and then send them off for photocomposition. All of this happened out of his sight and, although people-intensive, appeared to happen automatically.

The people who did these things were specialists. They generally did their work quickly and well and did not require detailed direction from the professional. Direction was possible, of course, but it was discouraged. The goal was to free the professional of these petty concerns so that he could get on with his own more exalted work. And because more direct involvement was difficult and time-consuming, most professionals did, in fact, leave these details in the hands of specialists.

The computer-assisted professional, however, has a rather different set of assistants. Instead of a clerical staff, he has word processing and document preparation systems. Instead of a drafting department, he has charting programs that prepare bar, line and pie charts directly from tables. Instead of technical illustrators, he has picture-making systems that can take his own hand drawings and integrate them with standard modules extracted from a library or developed from scanning other illustrations. Instead of the accounting department, he has electronic spreadsheets to do his cost distributions and tabulations automatically.

In many cases, the final product is of publication quality when it comes off the terminal. The process is now truly automatic; it is done by a personal workstation instead of by people. It no longer happens out of the professional's sight or without his direct control, however. He must learn to shape the output of each process to his purposes and how to fit the collected results into a coherent whole. He must become directly involved in all steps of the process.

Of course, the professional could provide the specialists with access to his files and operate very much as before, but he will choose not to do this. A modern, hands-on personal computer with a reasonable number of features exerts an attraction as seductive as Lorelei. It is very rewarding to watch one's own creation take shape under one's own hands.

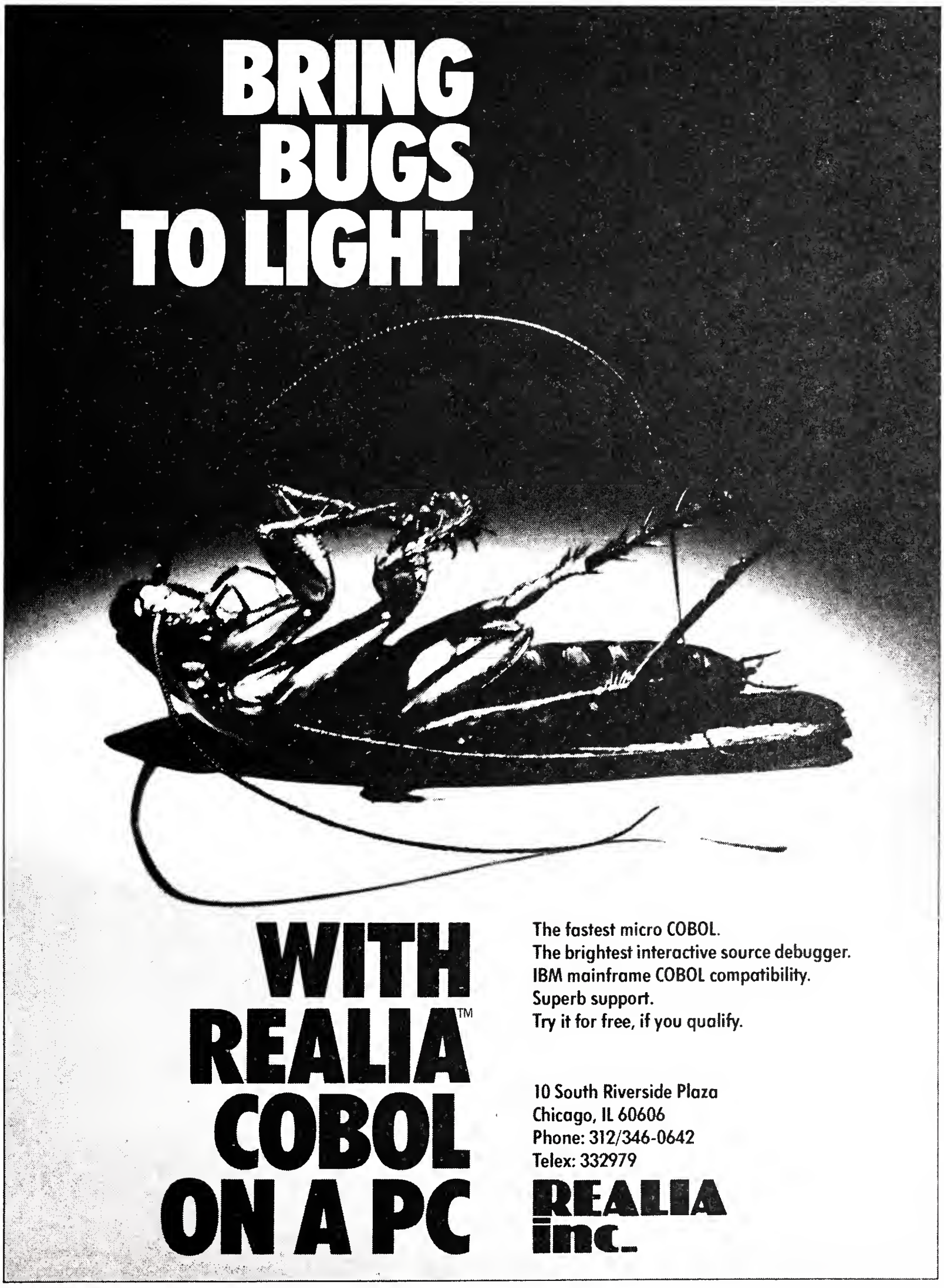
> *In the old days, the difficulty of the mechanics often served to govern the urge to change things. . . . Technology has made total reorganizations of large documents quite manageable and has provided every professional with the means to play with the appearance of a document.*

The computer assistance allows the professional to try out what otherwise he might have been reluctant to try, in public or through other people, in the precomputer days. He will make more modifications; he will change and change back. He will be more adventuresome than he would have been, for he no longer has to worry about the risk of appearing indecisive or the irritation that often accompanies the redoing of an apparently finished product.

The fascination of direct control accompanied by immediate feedback is immense, and it generates a desire to continue the cycle. The immediate feedback of the system seems to demand immediate feedback from the professional; the result is total immersion for long periods of time.

Play vs. work. The play aspect of the personal computer is closely related to the total immersion just described, for immersion tends to accompany enjoyment. One source of enjoyment is the sense of fulfillment that accompanies use of a computer-assisted workstation. This is, to some extent, a result of newfound competence, and perhaps it will disappear in time. For at least the next several years, however, the introduction of new products and capabilities will preserve the playful nature of personal computing.

Play is not necessarily bad; well-designed play can be instructive. Most likely, however, professional play on the personal computer will



take much the same form as did programmer play on the first couple of generations of mainframes. That is, there will be much limit testing and experimentation with the undocumented aspects of the systems available.

Nonproductive play does interfere with work. One side effect of the total immersion syndrome is the possibility that use of the personal computer can become so rewarding that it becomes an end in itself instead of a means to accomplish more constructive ends.

Instant response vs. lack of reflection. Not all minds work alike, but many of us find that much of our productive work is done off-line. When we wrestle with a problem awhile, then put it aside and come back to it, we often find that our subconscious was working on the problem during the interim and has discovered a way around a barrier or through a maze.

One of the joys of computer-assisted professional work is in the instant response of the system to the commands of the artist. No sooner does a professional think of something than it can take shape before his eyes. Carrying a document through from conception to final hard-copy form in one session is becoming increasingly common. While this mode of operation allows some amazing bursts of productivity, it also provides scant chance for reflection.

The subconscious mechanism also operates when any thought process is pushed into the background to make room for more immediate concerns. Thus, it is not unusual for the subconscious to take advantage of whatever dead time occurs between the successive steps of a traditionally organized project to suggest a modified approach that is preferable to the one originally in mind. In providing a computer assist that allows a professional to move from concept to camera-ready copy in one sitting, we are also depriving his subconscious of a chance to work on that task.

Avoidance of translation vs. incidental independent review. As noted above, the computer assist allows a professional to take a document from concept to camera-ready copy without the intermediation of specialists. One obvious benefit of this procedure is a reduction in the number of translating filters through which the product must pass. The result will be much closer to the original concept than was formerly the case and will be achieved with much less of the frustration attendant upon miscommunication.

A less obvious and less beneficial result of this procedure is the elimination of the several independent reviews that occur as each piece of the product passes through its specialists' hands. To begin with, the originating professional finds it necessary to express his intent clearly in order to ensure understanding on the part of the specialists. The specialists tend to read his work more carefully, for the material is unfamiliar, and they do not have the author's advantage of knowing his ultimate purpose; they have to make do with what he has written. As a result, they do not allow for the author's unexpressed intentions.

By contrast, it is extremely difficult for an author to proofread his own work competently, especially when he has been the typist as well. Traditional processing results in a document with fewer errors than is usual in a one-person process.

Faster results vs. more errors. The usual productivity claim for a computer-assisted system is that a person can produce more in less time. The rub comes when one asks, "Produce more what?" One answer — more errors — is implied by the loss of independent review noted previously. Another, similar answer is to be found in Parkinson's Law as applied to paperwork systems.

> *The usual claim for a computer-assisted system is that a person can produce more in less time. The rub comes when one asks, "Produce more what?"*

Parkinson's fundamental law is that work expands to fill the time available for its completion. When applied to paperwork systems, it becomes, "Reporting requirements expand until the most competent system in the field can no longer keep up with them."

In other words, as soon as the computer-assisted professional is capable of generating n pages a year, the reporting system will demand $1.5n$ pages. The result is that the professional is always behind and so is always eager to shorten the time from concept to product. He continues to expand his use of his personal computer system in order to avoid using specialists.

Professional as author vs. professional as secretary. The advantages of a computer assist for individual authorship have been amply described. There are also significant additional advantages for multiple authorship. Not only does each author enjoy the individual advantages, but the team is also enhanced by the ease with which text can be shared, edited, combined and moved, whether the several authors are co-located or separated by the width of a continent or an ocean. These amenities make it much easier to achieve an effective division of labor, a consistent style and a smoother blend.

On the other hand, a necessary consequence is that the professional becomes his own secretary. This situation is not necessarily bad, but whatever time the professional spends at secretarial work he does not spend at professional work. Moreover, the secretarial work in question is done more slowly than if it were done by a secretary, and it is done at professional, rather than at secretarial, wages.

Appearance of product vs. content of product. Very little of the discussion of productivity one sees in trade journals is concerned with what is probably the greatest advance provided by the computer-assisted workstation: the appearance of the product.

In the precomputer days, preliminary copies of documents-in-progress were rather ratty looking. Such appearance resulted not only from the fixed-pitch machines on which they were composed but also from less-than-adequate resolution, mimeo smudge and other artifacts of the precomputer office.

Today, however, the personal workstation can have an individual hard-copy device of virtually arbitrary quality, capable of printing anything his VDT can show. One suspects that the brave show made by these printers is responsible for much of the hyperbole surrounding computer-assisted workstations: It is not that more work is being done or is done better, but that the work looks better, regardless of content.

Programs that spell vs. people who spell. The decline in reading that has accompanied the growth of television has, as a side effect, contributed to the atrophy of spelling skills, at least in the U.S. An inability to spell a large portion of his technical vocabulary is a common failing of the young professional. This spelling deficiency is compounded by a similar inability to write coherently, much less cogently

There are two fundamental approaches to a problem of this nature: Teach the professionals the necessary skills or eliminate the need for them. The second alternative receives the most emphasis in the computing community. There are spelling programs, hyphenation programs, stylistic analysis programs, even some grammatical analysis programs.

As programs of this sort become more able, more of the proofreading burden will be shifted to them, and people will become less willing to do careful proofreading. These people may also become less able to do so, for the errors made by programs may be so different from those made by people that they are more difficult to detect. The result may be a serious decline in the overall quality of the finished product.

Friendly systems vs. friendly people. As the personal computer system becomes friendlier, the professional will be willing to spend more time with it. Until recently, spending a full day at a workstation VDT was impossible because of poor resolution and jitter; staring into a screen with such defects would produce eyestrain, headaches and, in extreme cases, disorientation. Friendly terminals feature rock-solid displays, extremely high resolution, nonfatiguing contrast and clear, precise graphics.

Friendly systems eliminate frustration as effectively as friendly terminals eliminate fatigue. As the barriers to extended use fall, the attractions for the personal computer systems will be more strongly felt, and the professional may spend more time communing with the system instead of communicating with people.

About the author

David Stevens is a staff senior scientist in the Office of Computing Resources at the Lawrence Berkeley Laboratory in Berkeley, Calif. The preceding article is based upon work done under U.S. Department of Energy contract DE-AC03-76SF00098 and does not imply endorsement of any product.

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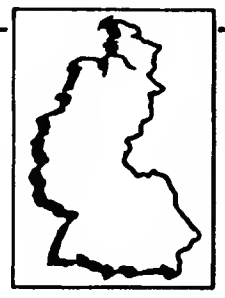

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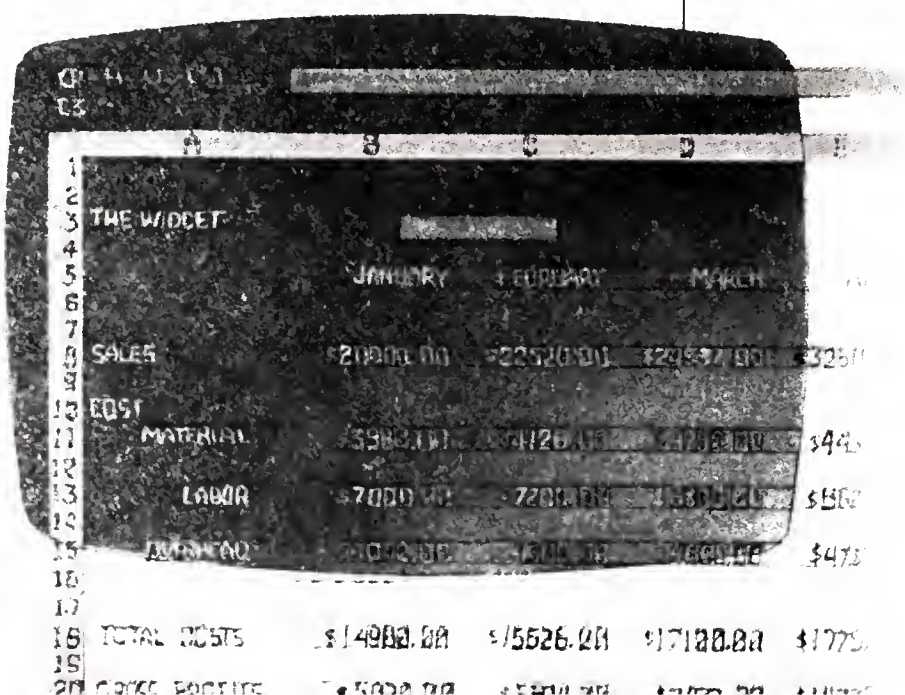

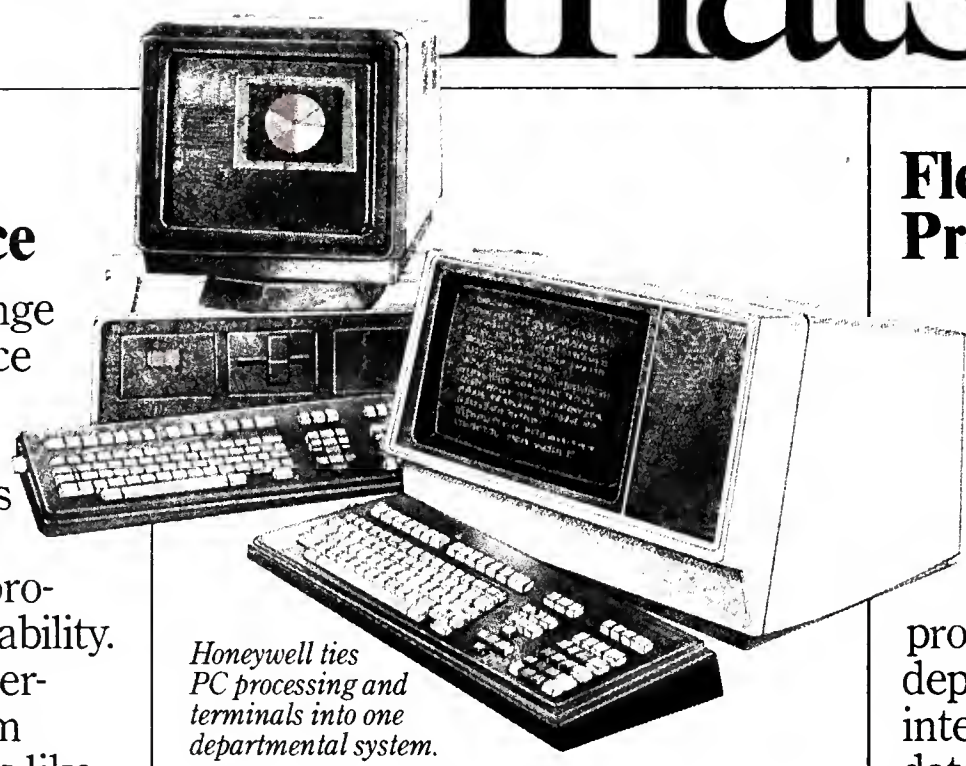

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• Data Entry Facility	Yes	Limited	Yes
• User Application Interface	Yes	Limited	Yes
• X.25 Networking	Yes	VS Only	Yes
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*Over 2000 installations.

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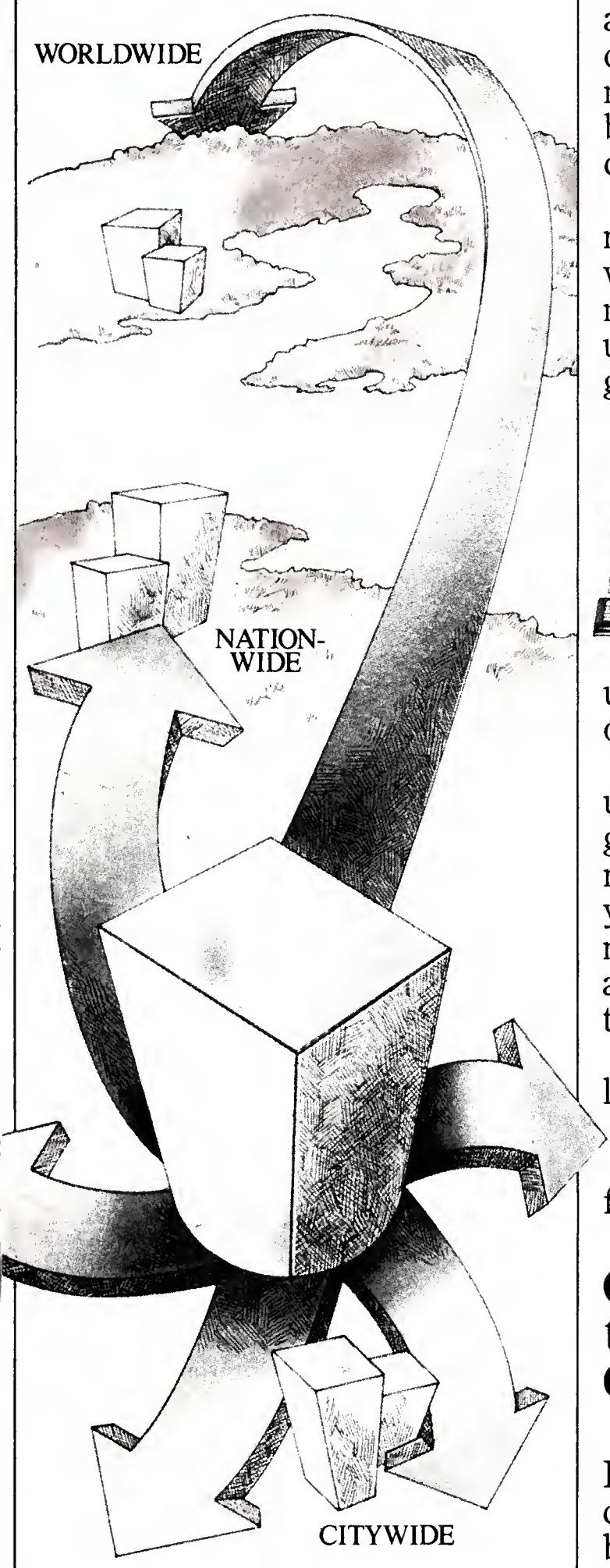

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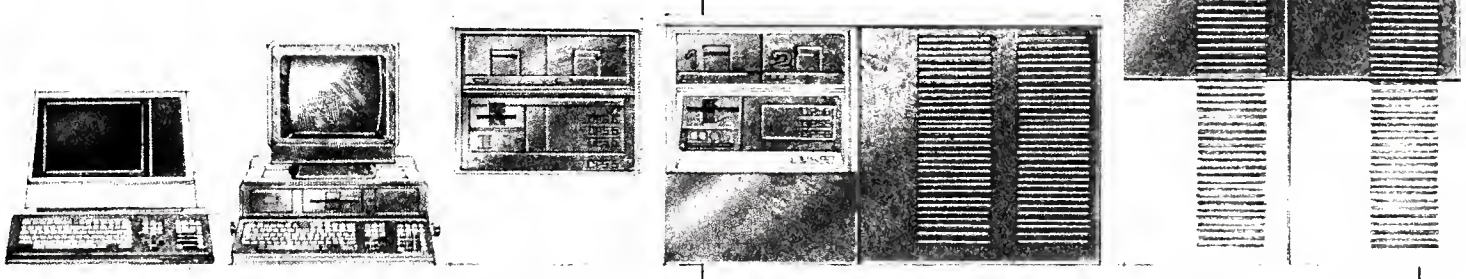

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SOFTWARE & SERVICES

Tool vendors need tie to DBMS

SOFTALK
By John Desmond
CW Senior Writer

"Hitch your wagon to a star."
Ralph Waldo Emerson, *Civilization*

If you're an applications software vendor without your own data base management system, you must hitch your wagon to somebody else's DBMS or risk being done in by the gods of software market misfortune.

McCormack & Dodge Corp. is pursuing this strategy in a big way by offering mainframe software not only for IDMS, Cullinet Software, Inc.'s leading independent DBMS, and IBM's IMS but also eventually for Applied Data Research, Inc.'s (ADR) Datacom/DB and IBM's DB2.

"The DBMS is the variable we can change," said Robert Kelley, vice-president of product strategy for M&D.

Hitching M&D's Millennium series of applications to the stars in the DBMS galaxy is the company's current focus. William J. Fitzpatrick, new product development manager, describes Millennium as a "bubble" that works inside various DBMS systems.

"It's an environment to develop applications independent of the file access system. Millennium is a bubble in which the application sits. You move it into the different environments you want it in," according to Fitzpatrick

The strategy differs markedly from Cullinet's approach. Cullinet executives argue that only users of Cullinet software can take advantage of all the resources of IDMS. Cullinet also maintains that true integration can only be achieved by writing applications in a fourth-generation language with links to a specific DBMS. They argue that their company offers a total solution.

Two slightly contradictory directions

See **WAGON** page 48

Bank counts on portable package

SCS provides fail-safe emergency check sorting

By Mitch Betts
CW Washington Bureau

FLINT, Mich. — It was 8 p.m. on Feb. 14 when the IBM 3890 magnetic ink character recognition reader/sorter went down at Genesee Merchants Bank & Trust Co. here, which depended on the equipment for managing its daily flow of checks. Light smoke was spotted in the computer room, probably from a melted circuit.

Daniel Overland, disaster recovery administrator at the bank, which has since been acquired by the National Bank of Detroit, said it took 47 hours of around-the-clock work by IBM service technicians and other specialists to bring the unit back to life.

But this disaster did relatively little harm to the bank's check processing operations, Overland said. While the repair crews worked, the Genesee staff took its checks and special disaster recovery software a few blocks down the street to Citizens Commercial & Savings Bank, where the processing was done on that bank's IBM 3890.

Working from 2 a.m. to 6 a.m. the next day, Genesee was able to capture one day's worth of checks — more than 100,000 items — in four hours, Overland said.

"What could have been a disaster in customer relations turned out to be not so bad," he said.

The portable software was the Survival Check System (SCS), a utility check processing package that enables banks to process their checks on another bank's IBM 3890 under emergency conditions. It is marketed by Vips, Inc. of Hunt Valley, Md.

SCS users said the key to the software is

See **BACKUP** page 47

Info system gives execs quick data

By John Gallant
CW Staff

NASHVILLE — An executive information system is a little like a doctor. Senior executives may not consult it often, but it has to be there when they need it.

"The executive information system has to be at hand and ready when your top people need it," said James Hardwick Jr. at the recent Information Center Conference & Exposition here. "It gives them a chance to get into the bowels of the company's data when they need information quickly."

Hardwick spoke from experience. In his role as budget manager with R.J. Reynolds Industries, Inc. in Winston-Salem, N.C., Hardwick managed a development team of six people that built an executive information system for Reynolds' key management personnel. (In addition to its domestic and international tobacco operations, R.J. Reynolds owns Del Monte Corp., Nabisco Brands, Inc., Heublein, Inc. and Kentucky Fried Chicken.) The impetus behind the development project, Hardwick said, was a mandate from the chairman of the board.

According to Hardwick, the microcomputer-based system gives Reynolds executives rapid and flexible access to summaries of vital operational data and information from a variety of outside sources. It is geared to non-DP professionals and provides easy-to-understand menus that guide an executive to the information needed to monitor the company's performance against its competitors and its own plans.

The Reynolds executive information system, which took shape during a six-month span from conception to pilot phase, consists of IBM Personal Computer XT workstations linked via Digital Communications Associates, Inc. Irma boards to an IBM mainframe under TSO. A Hayes Microcomputer Products, Inc. Smartmodem gives users access to a Digital Equipment Corp. VAX-11/780 under VMS and

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Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's SQL/DS or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM's SQL/DS and DB2. Programs written for SQL/DS or DB2 will run unmodified on ORACLE.

Originally designed for IBM mainframes and DEC superminis, ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either SQL/DS or DB2.

■ **Why not Cullinet, ADR or Focus?** There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as *the* standard database language. The Cullinet, ADR and FOCUS software packages each implement their own unique database language - each one painting the user into its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs *only on IBM mainframes?* Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE *are* identical.

FOCUS, Cullinet and ADR offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

■ **Why not just go with DB2 or SQL/DS?** A relational DBMS simplifies but does not by itself eliminate application programming. Additional tools are necessary if users are to create and maintain their own applications.

DB2 and SQL/DS are relational systems, period. ORACLE is a relational DBMS plus integrated 4th generation software tools for application generation, report writing, color graphics and network communications.

Furthermore, SQL/DS and DB2 run only on IBM mainframes (and are somewhat unlikely ever to run on another vendor's system). ORACLE runs on more IBM hardware and operating systems than do IBM's relational products.

■ **What about Goldengate, dBase III, Symphony or Framework?** PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributing the workload.

ORACLE is currently installed on over 1000 mainframe and supermini systems around the world, as well as on thousands of PCs. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and government agencies.

For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 415/854-7350.

Generator version out

WALTHAM, Mass. — Cortex Corp. has released Version 3 of the Cortex Application Factory for Digital Equipment Corp.'s VAX/VMS environment.

The Application Factory applications generator now includes a graphics option and a report generator. With the graphics capability, application developers can prespecify data extraction criteria and design custom plotting templates for end users. Users can select graphics options from the application menu, name the data and plotting template and generate the graph.

Users can select from 18 different templates. The graphics option provides a custom-controlled floating text capability to position labels or comments anywhere on the graph, the vendor said.

The report generator allows users to develop custom layouts of multipage reports. Reports are specified through an interactive screen painting process at the terminal.

Application Factory Version 3 costs from $40,500 to $89,000, depending on the VAX model. The graphics option costs from $4,500 to $10,500.

Cortex is located at 128 Roberts Road, Waltham, Mass. 02254.

SAS beefs up System 2000 DBMS

Cross Memory Services support added to line

CARY, N.C. — SAS Institute, Inc. has announced Release 11.5 of its System 2000 data base management system (DBMS) with enhancements for IBM's MVS and CMS operating environments.

Cross Memory Services support for the System 2000 multiuser product has been added in Release 11.5, a spokesman said.

The enhancement reduces the common storage area and offers increased accountability and data security. The multiuser product also offers accounting log and data recovery facilities.

The enhanced System 2000 offers a security exit that allows users to log six types of security violations. The data base administrator password offers a new level of authority between the master password and secondary passwords.

In addition, the enhanced DBMS offers users the ability to store data as well as time in the diagnostic log and to set format options in the same manner as the print command. A CICS interface enables users to obtain 132-column teleprocessing output.

The release is available to current customers for no additional charge. New sites can license the System 2000 DBMS for $12,000.

In addition to MVS and CMS environments, System 2000 runs under TSO, DOS/VSE and CICS on IBM 370, 3030, 3090 and 4300 series processors. It also runs on Sperry Corp.'s Series 1100 under OS 1100 and the Control Data Corp. 6000 and Cyber series mainframes under NOS and NOS/BE.

SAS Institute is located at SAS Circle, Cary, N.C. 27511.

PC/Com software gets enhancement

ATLANTA — Mom Corp. introduced an upgraded version of its PC/Com host communications interface software.

Version 3.8 gives users an optional virtual diskette capability that allows them to store microcomputer files on the mainframe.

The link provides for bidirectional file transfers, including data, text and binary files, in an IBM 3270 network.

It supports IBM's CMS, TSO and CICS and runs on the IBM Personal Computer, Personal Computer XT and Personal Computer AT, AT&T Information Systems' PC 6300 and other compatibles.

Prices for components

The link costs $395 for the micro component, $400 for the TSO and CMS components and $2,000 for the CICS component.

The virtual diskette option costs $50.

The company is located at Two Northside 75, Atlanta, Ga. 30318.

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SOFTWARE & SERVICES

PRODUCTIVITY AIDS

■ **Advanced Systems Concepts, Inc. has introduced a reverse compiling service that can retrieve lost source codes from compiled IBM RPG programs running on IBM's System/38.**

The service uses System/38 assembly-level machine interface programming to decode and analyze the program, the vendor said. Information contained in the program template, symbol table and break offset mapping tables associated with the program is referenced in order to retrieve the source.

The reverse compiling service costs 90 cents per line of code retrieved.

Advanced Systems Concepts, Suite S, 1350 Remington Road, Schaumburg, Ill. 60195.

APPLICATION PACKAGES

■ **Intersoft Systems, Inc. has announced a communications package that transfers data between Burroughs Corp. minis running its CMS operating system and its B20 micros.**

Datalink 100 consists of a file transfer program, terminal emulation software and data format conversion programs. The product works with micro packages that support IBM's Data Interchange Format and the Symbolic Link data format. Unformatted data from a minicomputer can be loaded into a micro word processing package.

The package can print reports with devices that work with the B20 or IBM Personal Computers.

Datalink 100 has an initial site licensing fee of $1,400 and an annual maintenance fee of $200.

Intersoft Systems, Suite 114, 10550 S.W. Allen Blvd., Beaverton, Ore. 97005.

■ **Computer Management Dynamics, Inc. (CMD) has announced a report generator for Wang Laboratories, Inc. VS minicomputers.**

Command reportedly enables users to create up to 15 files with any combination of fields and multiple criteria for record selection. The software uses standard Wang utilities such as Control File Utility.

Other features include multiple sort capability, subtotaling and user-defined calculated field capability, the vendor said.

Command for the Wang VS is priced between $5,000 and $10,000, depending on CPU size.

Computer Management Dynamics, 29 Riverside Drive, Nashua, N.H. 03062.

■ **PDA, Inc. has announced three applications packages for insurance companies using the IBM System/36.**

The Life Reinsurance Management system is designed for the administration of assumed, ceded and retroceded business. Modules include cession administration, billing, premium receivables and payables, reserve reporting, pool tracking, underwriting processing, claims reporting and client analysis. The product costs $140,000.

PDA's Accident and Health and Life Management system includes modules for policy administration, premium and reserve accounting, agency accounting, claims processing, financial and management reporting. The system is priced at $40,000.

The Stock and Bond Portfolio Management System for the IBM System/36 or System/38 assists users with management of an investment portfolio. It costs $10,000 for the System/36 and $15,000 for the System/38.

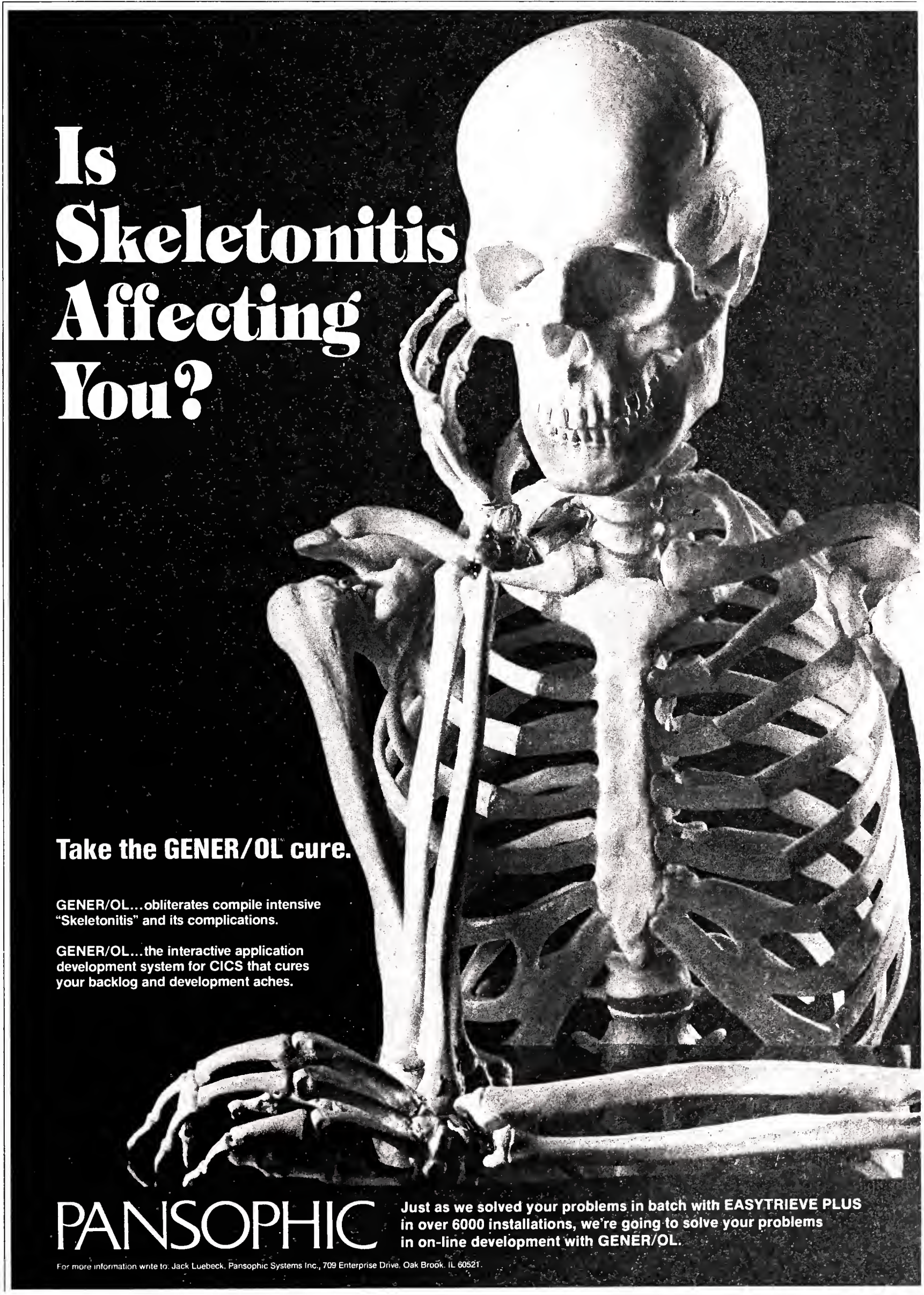
PDA, 11600 College Blvd., Overland Park, Kan. 66210.

■ **Computer-Aided Design Services, Inc. has announced software that reportedly allows drawing files to be transferred between a Computervision Corp. Cadds 4 or 4X Designer V system and an IBM PC-DOS-based microcomputer running Autodesk, Inc. Autocad drafting software.**

The Graphics Data Translator (GDX) consists of two software modules, the Autocad translation module residing on the Computervision mini and the communications features module on the micro. Users may develop drawing files on the Autocad-based workstation and upload them to the host or download host-generated files to the workstation.

Prices for the GDX are

Continued on page 46



SOFTWARE & SERVICES

Continued from page 45

$9,950 for the first Computervision system, $5,000 for each additional on-site CPU, $200 for each additional communications module and $125 for each additional communications software module to be used on a file serving network.

Computer-Aided Design Services, 1717 S. Orange Ave., Orlando, Fla. 32806.

■ **Larry Miller Associates, Inc. has announced Market Manager, an on-line marketing system for the IBM System/36.**

Market Manager can maintain mailing lists, assist with target marketing and telemarketing and store mailer, envelope and label information, the vendor said. The product allows users to define edit criteria and choose between sort or select functions using any sequence of criteria. It can also maintain parallel but separate files.

Market Manager is priced at $1,200.

Larry Miller Associates, 81 E. Queenwood Road, Morton, Ill. 61550.

■ **ADP Network Services, Inc. has added graphics capabilities to its Apecs/8000 project evaluation and control system for the Unix operating system.**

Apecs/8000 Version 1.8, which runs under Unix System V on Digital Equipment Corp. VAX and AT&T 3B processors, now allows users to produce bar charts, pie charts and line graphs.

Apecs/8000 is priced from $15,000 for supermicros, including DEC's Microvax II, to $150,000 on the DEC VAX.

ADP Network Services, 175 Jackson Plaza, Ann Arbor, Mich. 48106.

■ **Software International Corp. has introduced Release 5.5 of its accounts payable package for Hewlett-Packard Co.'s HP 3000 minicomputer.**

Enhancements include the elimination of all record numbers and the replacement of all sequential batch files with an HP Image data base of batch files. Also included are menu navigation capabilities that allow users to move from one function or screen to another, the vendor said.

Release 5.5 of the accounts payable package will be available in September and is priced at $19,000.

Software International, 1 Tech Drive, Andover, Mass. 01810.

■ **Computerized Forms Management, Inc. introduced Formanager, a form generation package for AT&T Unix-based machines.**

Formanager includes a resident data base of production standards listed by product code. Standards can be modified by the user, the vendor said. Users can also sort forms information from any combination of codes. The product allows users to detect duplication of forms and consolidate different forms.

Formanager is available for AT&T's Unix System 3 or 5.2 and for the IBM Personal Computer AT running Microsoft Corp.'s Xenix.

Base price of Formanager is $9,800 for a three-user system.

Computerized Forms Management, 880 N. York, Elmhurst, Ill. 60126.

■ **Leland Computer Services, Inc. has announced an additional component for its Purchasing System for IBM's CICS and IMS.**

The Leland Requisition Control System is said to manage the generation of a requisition and its resulting purchase order. Users may group requisitions into existing purchase orders and create a purchase order while assigning requisitions. The system's batch programs automatically generate requisitions for IBM's MRP and inventory accounting, allowing the Purchasing System to support those modules without modification.

The Requisition Control System is priced at $10,000 for a perpetual license.

Leland Computer Services, Suite 146, 8601 Dunwoody Place, Atlanta, Ga. 30338.

■ **Catalyst USA, Inc. has announced the Optimiser system for computerized control of stockroom operations, inventory and personnel. The packages runs on the IBM Series/1 minicomputer.**

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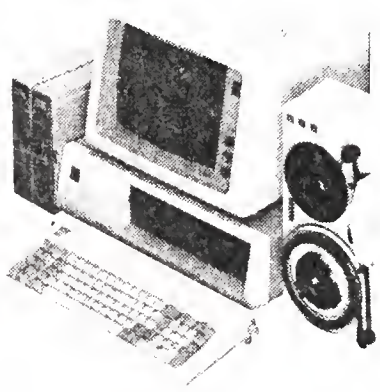

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According to a spokesman, the system determines the most efficient routes for batch or single-order retrieval when processing previously scheduled work queues or operator-entered issue orders.

The Optimiser system is priced at approximately $100,000.

Catalyst USA, 220 Oak St., Grafton, Wis. 53024.

■ McDonnell Douglas Computer Systems Co. has introduced a Municipal Management System for Microdata Corp. business computers.

Designed by Creative Computer Solutions, Inc., the Municipal Management System (MMS) consists of 16 modules including financial, inventory, equipment, payroll/personnel, purchasing, utility information system, licensing, parks and recreation and permits. In addition to the Microdata 4700, 600 and 9000, MMS works with McDonnell Douglas' relational data base management system.

Modules are priced from $1,500 to $8,000.

McDonnell Douglas Computer Systems, 17481 Redhill Ave., Irvine, Calif. 92714.

■ SDK Healthcare Information Systems has announced a financial management system for health care organizations. The product runs on a variety of computers using the Mumps operating system.

The SDK Financial Management system incorporates a query language, spreadsheet loader, report writer and downloading capabilities for transferring data to a micro.

SDK's Financial Management system software costs $20,000 to $40,000, depending on configuration.

SDK Healthcare Information Systems, 1550 Soldiers Field Road, Boston, Mass. 02135.

DATA BASE MANAGEMENT SYSTEMS

■ Database Utility Group has unveiled Version 2 of Adabas Performance Analysis System (Apas) for Software AG of North America, Inc.'s Adabas data base management system on IBM CPUs running under MVS, DOS, CMS and VM.

Apas Version 2 now allows users to gather Adabas command log statistics without writing them out on tape. It costs $8,750.

Database Utility Group, P.O. Box 4912 Federal Way, Des Moines, Wash. 98063.

■ Datasolutions International, Inc. has released a data base utility for the Hewlett-Packard Co. HP 3000 system with HP's Image data base management system.

The Command/3000 DBStatus reportedly checks Image data base capacities to help prevent the filling of Image files. DBStatus shows the capacities, current record count, space available, percentage full and warning messages for Image data bases.

The software requires a 1,600 bit/in. tape drive for installation.

The DBStatus package costs $200.

Datasolutions International, 55 Jefferson Blvd., Warwick, R.I. 02888.

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BACKUP from page 43

its two-part structure: the driver component is tailored to the installation's hardware and operating system and is installed at the backup site; the second component is a portable bank control file that contains such information as the stricken bank's account number structure and sort patterns.

That second component, the tape record of bank-dependent information, is transported to the backup site and installed when an emergency occurs.

'Would have been three days behind'

"Without the Vips software, we would have been three days behind in our processing," Overland said. "Instead we were one day behind. The money saved in float more than paid for the Vips package," he said.

Overland said his disaster recovery agreement with Citizens also allows that bank to use his IBM 3890 on an emergency basis.

This form of mutual assistance — one bank helping another in a crisis — started in May 1980, when a group of banks in the Washington, D.C., area formed a nonprofit organization called Bancon, Inc. to provide disaster recovery services for its members [CW, Aug. 9, 1982]. One of its first acts was to contract with Vips to develop the software that became known as SCS.

Currently 10 member banks

Bancon now has 10 member banks in the District of Columbia and nearby Maryland and Virginia counties, and four other area banks have submitted applications to join, according to one of Bancon's directors, Michael R. Longo, vice-president and data center manager at the National Bank of Washington.

"Our basic objective is to provide contingency planning for check processing . . . which is the one data processing function that is unique to banks," Longo said.

"We agree in principle to help each other in a disaster, no matter how small or large," he continued.

Given the increasing competition in the banking industry, Longo said, he is "amazed" at the cooperative spirit among Bancon members.

"I don't know what's going to happen when we have full deregulation and the competition gets keener, but right now it is a very cooperative attitude that all of us share," Longo said.

REYNOLDS from page 43

remote public data bases.

The link to the mainframe lets executives tap into summary operational and financial data, while the VAX link provides users with messaging capabilities and access to other administrative functions, Hardwick explained.

Housed in special cabinets

The micros are housed in special cabinets that also contain printers. They offer a consistent set of commands, menus and interfaces, regardless of which host is being tapped, according to Hardwick.

Through the executive information system, Reynolds' key players can quickly review the latest news and detailed information on what Hardwick labeled "peer" companies from remote data bases, summary financial forecasts, unit volume and market share data, "subunit-level" data and specially tailored reports, Hardwick said.

Strategic statistics, such as operating performance vs. forecast, are also available through simple commands. Each of the executives receives one-on-one instruction and works with Hardwick's staff to modify the executive information system to their own needs.

On-line fact book

For example, developers put a special "fact book" containing vital information on-line for Reynolds' president, as well as a variety of financial modeling capabilities for the treasurer.

That type of tailoring, which Hardwick said represented about 80% of the development life cycle, is an ongoing process.

In addition, executives enjoy private hot line support when problems arise.

Most of the data that Reynolds' executives access is maintained in Thorn EMI Computer Software's FCS-EPS decision support system, which the company had in place for several years before the executive information system was conceived.

Data is not simply "dumped" into the executive information system data base, Hardwick said.

Rather it is carefully reviewed and then validated by managers responsible for its accuracy, Hardwick explained.

Depending on its nature, data is updated weekly, daily or throughout the day.

"We provide them with blessed data, not just information that has been randomly grabbed from throughout the company," Hardwick said.

'Someone to beat on'

"The executives need someone to beat on if the data is wrong. They need someone to take responsibility for its accuracy."

What was the biggest obstacle to the development of the executive information system? Tying together the very different worlds of data processing, office automation and personal computing, Hardwick said.

Although he would not divulge the total cost of the development project, Hardwick said each workstation cost approximately $9,000.

How can he tell the project was a success? According to Hardwick, "They use what they asked for."

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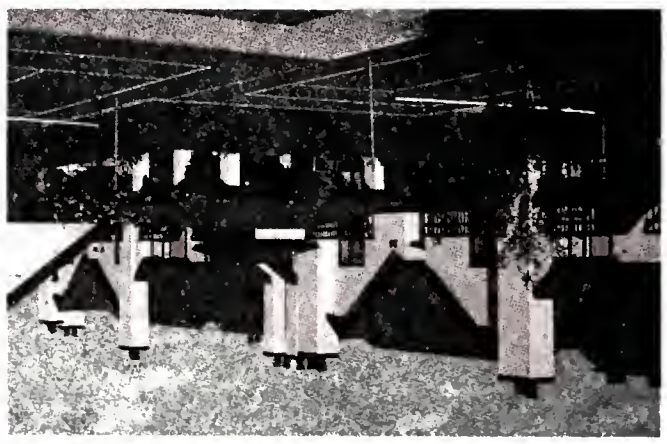

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WAGON from page 43

emerged at McCormack & Dodge's recent World '85 users conference in Boston. On the one hand, M&D President Frank Dodge said he wants his 16-year-old organization to be the No. 1 software company.

On the other hand, M&D's staff — heavily weighted with accountants — currently seems geared toward producing the highest quality financial applications. Dodge called M&D's new accounts receivable package "the best product the company ever produced."

Maybe company presidents are being required by marketing representatives to say they want their companies to be No. 1. Everyone is saying it. But M&D's strategy requires that the DBMS vendors remain healthy themselves.

The experience of Management Science America, Inc. (MSA) may have relevance for M&D. The former No. 1 independent software company has slipped from that position and now touts itself as the No. 1 applications vendor. Could that have happened because MSA has no DBMS?

Users are looking for a total solution; at least, that's what the vendors say. If that is true, can an applications-only company expect to remain one of the world's largest software companies? Some say the day will come when a few megacompanies will meet most of the world's software needs. If so, won't the companies with their own DBMS and a variety of applications software be best positioned to thrive?

Companies like ADR are in a slightly different predicament. ADR has a successful independent DBMS in Datacom/DB but markets few applications. This lack of product line diversity may hurt ADR in competition with a company like Cullinet.

Although 1985 has been a slow year in the DP industry, the mood was upbeat at the M&D user meeting. Dodge said he is glad M&D is privately held, because his time is not taken up talking to Wall Street analysts.

"I don't have to worry about the price of stock," he said. And he wished John Landry, former vice-president of research and development, and Robert Weiler, former senior vice-president of marketing, well in their new venture at a smaller software company.

As long as users find it cost-effective to buy M&D applications to work with another vendor's DBMS, the mood should remain upbeat.

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MICROCOMPUTERS

Info centers changing vendor policies

By John Gallant
CW Staff

NASHVILLE — Major changes in the way microcomputer software vendors license and support their products are on the horizon. But only those companies that have implemented personal computing standards and centralized acquisition and service through an information center will have the clout needed to take advantage of those changes.

That was the message Dennis Lunsford offered to attendees at the recent Information Center Conference & Exposition here. Lunsford is chief of the National Security Agency's (NSA) Personal Computing Information Center (PCIC) headquartered at Ft. George G. Meade in Maryland. With fewer than 20 staff members, Lunsford's PCIC is the focal point for all micro hardware and software evaluation, acquisition and support for the far-flung offices of the NSA.

For security reasons, Lunsford said, he could not divulge the number of users, machines or remote locations supported, but the PCIC is responsible for a geographically scattered population of personal computers numbering in the thousands.

Lunsford described the PCIC as a second-generation information center, one that provides no mainframe support but controls all microcomputer operations within the massive government agency. The PCIC maintains an inventory of nearly 70 standard software products and represents users on agency procurement boards.

Vendors forced to rethink policies

According to Lunsford, the emergence of powerful information centers, which draft and enforce personal computing policies in large companies, is forcing micro software vendors to rethink their policies on licensing and support.

"The large buyer is a new factor in the industry," he said. "The large buyer is the software market now, and we need a new architecture. There are a lot of practices in this industry that are based on one-copy sales. The major companies have to change their views. Large buyers and new technologies like local-area networks and software downloading are challenging current licensing and support arrangements."

But Lunsford cautioned that information center managers will not be able to take advantage of upcoming opportunities unless they have established standards and are controlling acquisition and user support.

"You need to establish a positive, long-term relationship with a vendor, become a key customer," Lunsford said. "But all of that is absolutely tied to the fact that you must have standardized products and have centralized service, support and acquisition. Only in that way can you maximize

See CHANGE page 56

■ Micro Data Base Systems enhanced its Knowledgeman integrated software package with a host of new features/**50**

■ Corporate Software released an updated version of its guide to microcomputer software for business users/**52**

INSIDE

Software/**52**

Communications/**52**

SMALL TALK
Eric Bender
CW Senior Editor

Lively discussions highlight AI meet

The International Joint Conference on Artificial Intelligence (IJCAI), held two weeks ago at the University of California at Los Angeles, was a cut above most computer meetings. The location was pleasant, the technology was full of intriguing twists, and the AI developers allowed to roam freely in public seemed to be cheerful types. Some quotes from AI gurus and others:

■ "AI is a weak technology," said Beau Sheil, manager of product marketing at Xerox Artificial Intelligence Systems. "It works best with a lot of information that can be manipulated at a shallow level.

See AI page 56

Mac business products bow

Macworld exhibitors target corporate mart

By Edward Warner
CW Staff

BOSTON — Though few members of the three-piece-suit set attended Macworld, a show of products for the Apple Computer, Inc. Macintosh here last month, those who did found several new products directed specifically at business users' needs. Among those products were the following:

■ A 20M-byte hard-disk storage unit. Introduced by General Computer Co., the Hyperdrive 20 is said to be the first internal hard disk of such capacity for the Macintosh.

■ Business Filevision from Telos Software Products, a program for filing graphics with text. This product, a business users' version of Telos' Filevision, reportedly can create larger files than Filevision and import digitized clip-art and Ascii files from other programs.

■ Sidekick, from Borland International, Inc., a desktop manager program long available in the IBM Personal Computer world.

■ Tempo, a program for creating macros for such Macintosh software as Lotus Development Corp.'s Jazz. Jazz and many other Macintosh programs do not support macros, the strings of commands that a program such as Tempo can memorize and make available at the touch of a key.

■ Colormate, a hardware and software package for color printing of Macintosh output. This NEC Information Systems, Inc. product is being sold for use exclusively with the NEC Color Pinwriter printer.

Most notable among the new offerings for business, though, is the $2,795 Hyperdrive 20. While internal storage units of such capacity have been available for some time for IBM Personal

See APPLE page 54

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Knowledgeman gets version with menu-driven interface

By Charles Babcock
CW New York Bureau

NEW YORK — A menu system and a natural-language query facility have been added to the Knowledgeman software package to produce Knowledgeman/2, Micro Data Base Systems, Inc. (MDBS) announced last month.

The package offers a number of additional options, including K-Comm for remote, asynchronous communications; K-Report for custom report generating; K-Text for text processing; and K-Paint for forms management. All the options work with a relational data base manager that was part of the original Knowledgeman issued in 1983, said Gary Koehler, president and chief executive.

Knowledgeman/2, to be shipped this week, will retail for $595. Existing Knowledgeman users can receive the updated version for $295, Koehler said.

Prices for multiuser versions

Multiuser versions are also available for $1,795 for up to 10 users on a local-area network and $3,325 for up to 32 users. Knowledgeman/2 works with Novell, Inc. Netware nets, 3Com Corp.'s Ethershare nets and IBM's PC Network. Knowledgeman/2 also works on systems running under AT&T Unix, PC-DOS, MS-DOS, CP/M-86 and up to Digital Equipment Corp. VAX systems.

The menu system is meant to overcome a criticism of the original Knowledgeman that it was difficult for a novice computer user to use, company officials said. Knowledgeman/2 will offer a user 400 pages of Help screens with menus offering selections into environment setup, computation, data management, spreadsheet, graphics, text processing and a gateway to the operating system.

After proceeding through a sequence of menu choices, users will have specified a command, which appears on the screen to teach the user the command language and to provide a shortcut to where they wish to go, the vendor said.

The natural-language query system, dubbed K-Chat, uses simple English words to query the system. Ambiguous queries can be clarified through an English conversation sequence. K-Chat has a vocabulary of 500 words and the ability to incorporate new words and phrases defined by the user, company officials said.

The spreadsheet component can extract data from independent records, spreadsheets, reports or data base tables and can use up to 65,525 cells per table, company officials said.

Prize of $800,000

MDBS is attempting to compete with other micro data base management systems vendors by offering an $800,000 prize to the user who submits the best 500-word essay on the reason for switching to Knowledgeman/2 from a competing product.

The entries will be judged on the basis of their "accuracy and originality," said Stephen Recobs, MDBS executive vice-president. The company did not indicate who would judge the essays.

MDBS can be reached through P.O. Box 248, Lafayette, Ind. 47902.

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DRI to offer Summamouse with GEM line

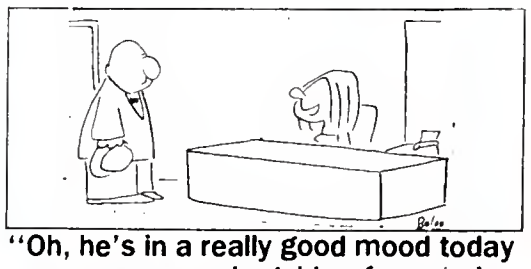
FAIRFIELD, Conn. — Digital Research, Inc. (DRI) will offer the Summagraphics Corp. Summamouse as an option in specially priced packages of its GEM Collection software line under an agreement announced by the two vendors.

Summagraphics, located here, said the venture marked its first product offering for micros. DRI's GEM Collection runs on the IBM Personal Computer and compatible machines. It includes GEM Desktop, said to permit the user to manipulate files and operating system commands using a mouse interface, as well as GEM Paint, a 16-color electronic paintbrush program and GEM Write, a word processor.

The Summagraphics Summasketch electronic drawing tablet, meanwhile, will be offered as an option by DRI in specially priced versions of its GEM Draw package, which includes GEM Desktop and GEM Paint, Summagraphics said.

With the Summamouse, the GEM Collection costs $295. GEM Draw with the Summasketch option costs $649.

Summagraphics is located at 777 State St. Extention, Fairfield, Conn. 06430. DRI is located at 60 Garden Court, Monterey, Calif. 93942.



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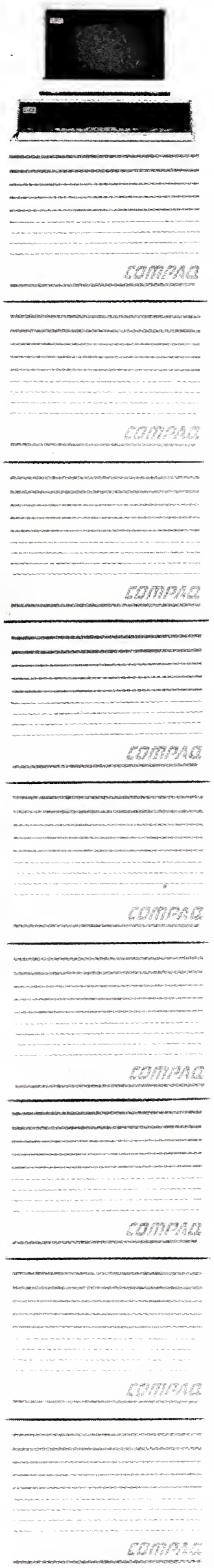

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*Source: Datamation Magazine, June 1, 1985.

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Directory evaluates micro wares

CANTON, Mass. — Corporate Software, Inc. has introduced "The Corporate Software Guide," a directory of 350 personal computer software and hardware products from 125 vendors.

The guide reportedly contains in-depth evaluations and comparisons of the products, which are divided into 18 categories. Each product category includes an overview of the products and likely applications in that category.

The 300-page guide costs $19.95, plus $5 for shipping. It is free to personal computer hardware or software buyers in Fortune 1,000 companies who request the guide in a letter written on company stationery. Orders and requests should be sent to Corporate Software, 770 Dedham St., Canton, Mass. 02021.

SOFTWARE

■ **STSC, Inc. has announced that its APL Plus PC System, an applications development system, now supports IBM's high-resolution Enhanced Graphics Adapter (EGA) and Enhanced Color Display Monitor.**

The EGA provides 16-color, 640- by 350-pixel bit-mapped graphics for the IBM Personal Computer and compatible color or monochrome displays. The APL Plus PC System fully supports all modes of resolution on the EGA, the vendor said.

The product implements the APL programming language and includes a full screen editor for programs and data, report formatting, filing and high-resolution color graphics.

The APL Plus PC System sells for $595.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.

COMMUNICATIONS

■ **Emerald Technology Group, Inc. has enhanced its program that supports file transfer between the IBM Personal Computer line and IBM System/34, 36 or 38.**

Enhancements to the Emulator Transfer Utility reportedly include local emulation support with packages such as IBM's 5250 emulation kit and Ideassociates, Inc.'s Ideacomm 5251 and print spooling capability.

The product now supports copy library members, such as procedure and source li-

Continued on page 53

Decision modeling software out for Macintosh

BOSTON — Softstyle, Inc. has introduced its Decisionmap decision modeling software for Apple Computer, Inc.'s Macintosh. The unveiling came last month here at the Macworld conference.

The $145 Decisionmap reportedly permits users to experiment with different weightings of decision factors and various rankings of alternative decisions in the manner of a spreadsheet. Unlike a spreadsheet, however, Decisionmap is said to work with qualitative data.

Decisionmap users reportedly can produce a diagram or map of the factors involved in a decision and adjust the weighting of those factors at any level.

Decisionmap users begin by entering the key factors in a decision. Up to five factors can be entered at any level, and the factors can be broken down into any number of subfactors. A tree-like map results, with a main trunk representing the decision and the various factors and subfactors represented as arms of the tree.

The various factors are then weighted, and a bar chart can be produced to compare how each alternative stacks up. If the weighting or ranking is changed, a "what-if" analysis can be done on the alternatives.

Softstyle is located in Suite 205 of the Hawaii Kai Office Building, 7192 Kalanianaole Highway, Hawaii 96825.

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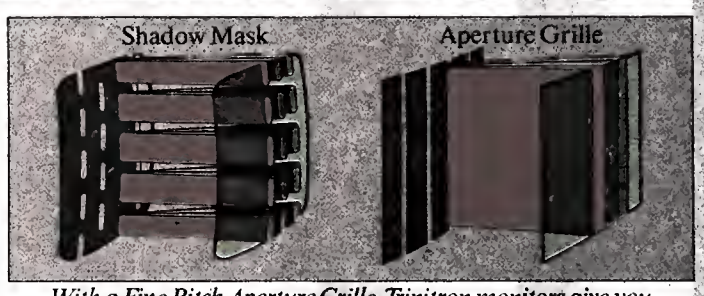
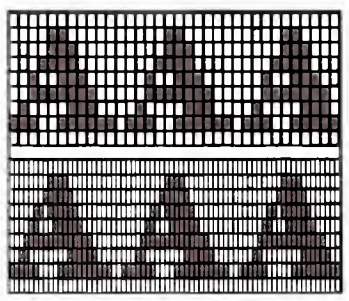


With a Fine Pitch Aperture Grille, Trinitron monitors give you dramatically brighter colors than the conventional shadow mask.

And third, a dot pitch so fine, the horizontal resolution of a Sony is not only the highest in its class, but "close to that of models costing twice as much" (Computer Buyer's Guide and Handbook).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MICROCOMPUTERS

Continued from page 52

braries between the micro and the larger system, Emerald said. Data formats such as Ascii fixed, Ascii variable and Ascii text can be mapped to larger system formats and vice versa.

The package costs $400 for a System/34, $500 for a System/36 and $800 for a System/38.

Emerald Technology Group, Suite 102, 1601 116th Ave. N.E., Bellevue, Wash. 98004.

■ **Softronics, Inc. has announced an enhanced version of its Softerm PC communications and terminal emulation software for the IBM Personal Computer, Personal Computer XT and AT.**

Softerm PC Version 1.02 reportedly includes a built-in text editor, logon security and access restrictions, new commands for use in automatic batch command files and a terminal emulation hotkey that provides access to communications and terminal emulation while using other programs.

The software reportedly emulates more than 30 terminals, including the IBM 3101 Model 10 and 3101 Model 20; Digital Equipment Corp. VT52, VT102 and VT220; Hewlett-Packard Co. 2622A; and Honeywell, Inc. VIP7250, VIP7801 and VIP7803.

The program requires 128K bytes of memory.

The price of Softerm PC Version 1.02 is $195. Upgrade cost for current users is $25.

Softronics, Suite 10, 3639 New Getwell Road, Memphis, Tenn. 38118.

■ **Persoft, Inc. has enhanced Smarterm 400 3.1, a file transfer program operating between IBM Personal Computers and Data General Corp. minicomputers and superminicomputers.**

The enhancements are said to consist of compressed display mode support for terminals with 132-col. video interface boards, the ability to switch between a communications session and an IBM PC-DOS session and additional function key support.

Smarterm 400 supports advanced functions of DG D100, D200 and D400 terminals including multiple display windows, full character display attributes, line drawing, word processing character sets and local printer support.

Smarterm 400 3.1 costs $149. Existing customers can upgrade their packages for $40.

Persoft, 2740 Ski Lane, Madison, Wis. 53713.

■ **4D Software, Inc. has announced a package that permits IBM Personal Computers to emulate NCR Corp. terminals.**

Connection/7900 enables an IBM Personal Computer to mimic the NCR 7900 Model 3 and NCR 796-301 terminals. The package features page and message mode transmission, full status line support, Level 2 diagnostic capabilities, the ability to work with a numeric keypad, cursor control and function key support.

Users reportedly can capture screens of data to perform file or screen transfers.

The software requires 256K bytes of random-access memory and IBM's PC-DOS operating system.

Connection/7900 costs $195.

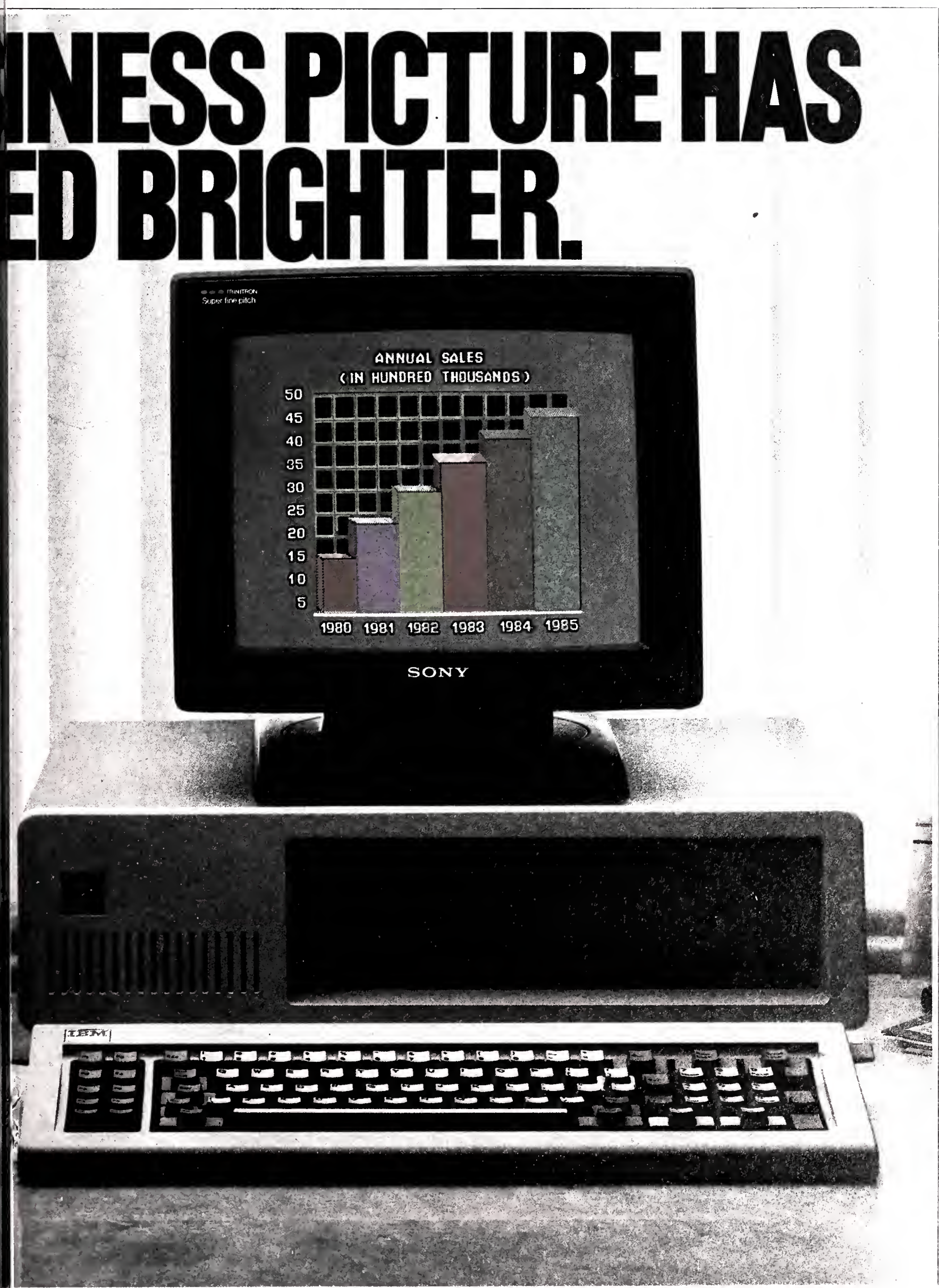
4D Software, 8759 N.W. 57th St., Tamarac, Fla. 33321.

■ **Atlantic Research Corp. has introduced its Xpert PC Card, an option board for the IBM Personal Computer that reportedly permits users to connect with up to four hosts at a time via an X.25 packet-switched net.**

The Xpert PC Card reportedly provides the Personal Computer with two ports for Ascii devices and permits Personal Computers to share X.25 lines. It emulates the IBM 3270, Digital Equipment Corp. VT100 and other Ascii devices while attached to the X.25 network.

It is priced at $1,795.

Atlantic Research, 5390 Cherokee Ave., Alexandria, Va. 22312.



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MICROCOMPUTERS

APPLE from page 49

Computers, most disks for the Macintosh held a maximum of 10M bytes, including General Computer's original Hyperdrive offering.

Like the Hyperdrive, installation of the Hyperdrive 20 by an authorized General Computer dealer will not void the Macintosh warranty, according to General Computer.

Hyperdrive 20 also reportedly comes with software for partitioning of the disk into 32 file drawers — each with a separate icon on the screen — and for scrambling of the contents of the files, the latter being a file security system.

Print spooling software is also included to permit the Macintosh to be put to other uses while output is printing.

Hyperdrive 20 costs $2,795 and will be available in early October. Hyperdrive users will be able to upgrade to 20M bytes of storage for $895 after Dec. 6.

The $395 Business Filevision reportedly offers other features that exceed the capabilities of Filevision itself, including a drawing area that is 8 in. by 10 in. rather than only the size of the Macintosh screen.

Users are able to move the drawing area about on their screens to get full access to it.

Another Business Filevision enhancement is the ability to work with files as large as 4M bytes and to exchange Ascii, Data Interchange Format and Sylk files with programs using those file formats. Business Filevision will be available in November and requires a 512K-byte Macintosh.

Borland's version of Sidekick for the Macintosh reportedly offers several enhancements over Borland's version for IBM Personal Computers, including a limited form of concurrency under which users reportedly can print or telecommunicate in the background while using such Sidekick features as its notepad in the foreground.

Another advantage of Sidekick in its Macintosh version is its telecommunications capability. Reportedly available are such functions as a phone log for incoming and outgoing call logging and instant area code lookup.

The communications function is said to be compatible with Hayes Microcomputer Products, Inc. offerings and to support file transfer at 300, 1,200 or 2,400 bit/sec. using either the computer's modem or printer port.

Standard Sidekick features such as an on-screen calculator and a daily appointment calendar are reportedly also included.

Affinity Microsystems Ltd.'s Tempo permits users to edit a macro so that it will pause for data entry while it executes.

Macros created by Tempo can also branch on a logical command or transfer information between unrelated programs.

The program works with nearly all software for the Macintosh, Affinity said.

Colormate is said to make color printing available for Macintosh users for the first time. It permits up to eight colors to be used in printing text or graphics from such applications as Apple's Macdraw and Macproject and Microsoft Corp.'s Microsoft Word and Microsoft Chart.

It also supports one-color printing. Colormate is $125 and can be purchased with the NEC CP2-6 and CP3-6 Color Pinwriter dot matrix printers for $1,210 and $1,610, respectively.

General Computer is located at 215 First St., Cambridge, Mass. 02141.

Telos Software Products is located at 3420 Ocean Park Blvd., Santa Monica, Calif. 90405.

Borland International is located at 4585 Scotts Valley Drive, Scotts Valley, Calif. 95066.

Affinity Microsystems is located at 745 LaFarge Ave., Louisville, Colo. 80027.

NEC Information Systems is located at 1414 Massachusetts Ave., Boxboro, Mass. 01719.

TI announces the portable sales tool for General Electric Plastics' field communications.

Instant access with their technical data base and 24-hour communications with headquarters. That's what the SILENT 700™ Model 707 with its easy access module means to GE Company's Plastics Sales Division. Regardless of time zones and sheer distance from the home office, GE Senior Sales Representative Ray Forester can get the latest product data and cost analysis information he needs to prepare for and close a sale. All he needs is his TI 707 portable data terminal and a telephone.

"With the terminal, I can tap into GE Plastics' data base. When ERIS (Engineering Resins Information System) is accessed by my TI 707, I can provide a customer with technical information and product specifications on the spot and leave him with a printout to review.

"The terminal also acts as my message center when I'm in the field. I transfer messages through the GE Crossfile (electronic mail), and the individuals receive them in written format when they pick up their messages. They seem to respond more promptly with accurate, hard copy in front of them. And since I can receive messages anytime, anywhere, the TI 707 all but eliminates 'telephone tag.'"

Ray Forester believes that the TI 707 is ideal for the salesman on the go. It's lightweight and rugged, takes up approximately one half of a briefcase, and is quiet even at peak operation. "It's exactly the productivity tool we needed for our division's field communications," he concluded.

Find out about the Model 707 SILENT 700 Portable Data Terminal from TI and how it can solve your communications problems. Call 1-800-527-3500, ext. 709; in Canada, 416-884-9181. For more information write TI, P.O. Box 809063, Dept. DTB 1930W, Dallas, Texas 75380-9063.

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But that's exactly what we're going to do in our October 16th Office Automation issue of *Computerworld Focus*. And that gives you an ideal forum to sell just about any computer-related office product you have. Because you can surround your advertising with hot, relevant editorial.

We'll start by taking a look at the needs of the end user. And how today's technologies and MIS/DP departments are—or aren't—handling the problems.

Then we'll discuss today's trends and where they seem to be taking us. Trends like top-to-bottom computer architectures. Standardized communications protocols and operating systems. Integrated software. Fiber optics. Cellular radios and phones. Just about every new twist for the office of the future.

So if you've got a product or service that belongs in the automated office, it also belongs here. The **October 16th** issue of *Computerworld Focus*. But hurry, closing is **September 6th** (materials due one week later).

For more information, contact Ed Marecki, Vice President/Sales, *Computerworld Focus*, 375 Cochituate Rd., Framingham, MA 01701 at (617) 879-0700. Or call your local sales office.

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AI from page 49

"What you see on the show floor is very technically sophisticated and very demanding, but commercial customers want stability," he pointed out. Developers and customers are split into two camps: "One group wants to rush out with all this steaming software, and the other says, '3-year-old software is just fine.' "

Most of the demand for AI-based technology comes from someone outside of information systems management trying to solve a problem, Sheil noted. "The technical community tends to be conservative," he said, but sooner or later it will have to make peace with the early adapters to artificial intelligence.

Some firms that support AI research groups "have no intention to pay attention to what the groups will do," he added, mentioning IBM in particular.

■ Sheil's boss, General Manager Alan Moskovitz, said Xerox has received an order for 1,000 of its new 1185 workstations. These will end up "on the desks of professionals providing end-user services to consumers." Xerox is "flooded with requests" for other purchases at that volume, he claimed.

■ "AI is different than it was 20 years ago," said Alan Kay, an Apple Computer, Inc. Apple Fellow. "First, people are making money on it." Quoting Henry David Thoreau's advice to "beware of all enterprises that require new clothes," he drew laughter and applause from hundreds of listeners in the crowded ballroom.

"Instead of doing problem solving, we need to do problem finding, and I think that's where AI has really fallen down in the past few years," he remarked.

Kay also pointed to limitations in logic-based programming ("logic is a very, very weak way to go about solving problems") and parallel processing ("if the [Intel Corp. 80286] is a computer with a terrible architecture, what is it when you have 16 of them?").

■ Verbally, at least, we're seeing "intelligence inflation," joked Ronald Brachman, an AT&T Bell Laboratories researcher. "We had intelligent terminals 15 years ago, so what do we have now? Hyperintelligence?"

Brachman also stated that "the things we know as expert systems are very fragile." An expert system's performance falls off drastically at its outer bounds, and "it's almost impossible to characterize what those bounds are," he said.

Additionally, those using an expert system may have no idea of its limitations. "Expert systems that do diagnosis usually don't know that people have two arms and two legs," he said.

■ Hector Levesque of the University of Toronto neatly summed up a similar point: "You certainly wouldn't want an expert system to control the landing of jumbo jets."

■ "This technology is really immature," said Larry Geisel, president of Carnegie Group, Inc. "We've been in it for seven years, and we know how little we know." He described most of the artificial intelligence products on display as "absolute toys" and said that "AI solutions don't scale up."

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Not long ago, STEAMER revolutionized the data communications industry. And now, it's doing it again. Because now STEAMER has synchronous support.

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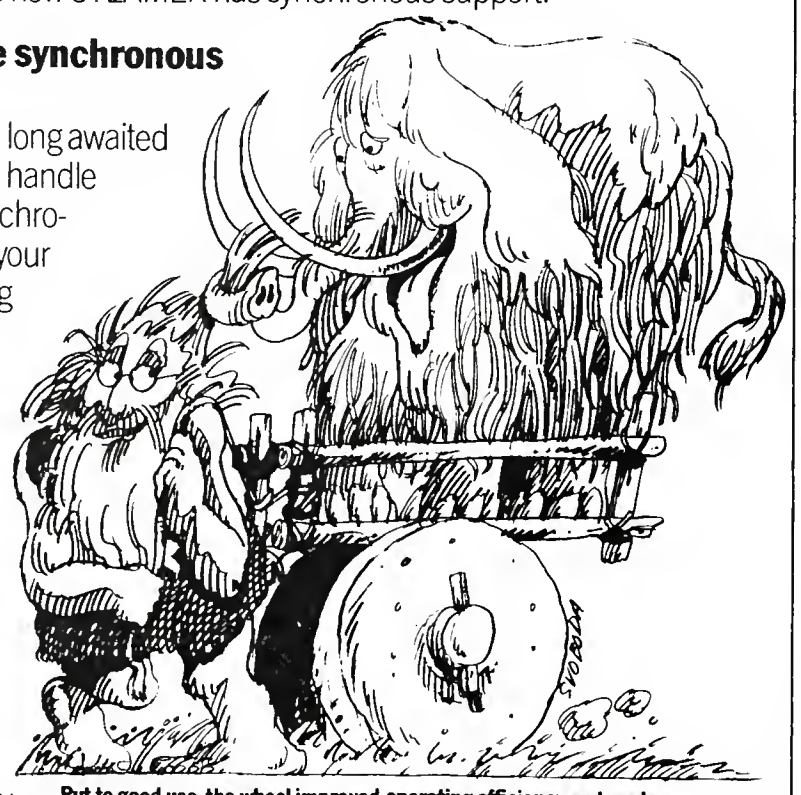

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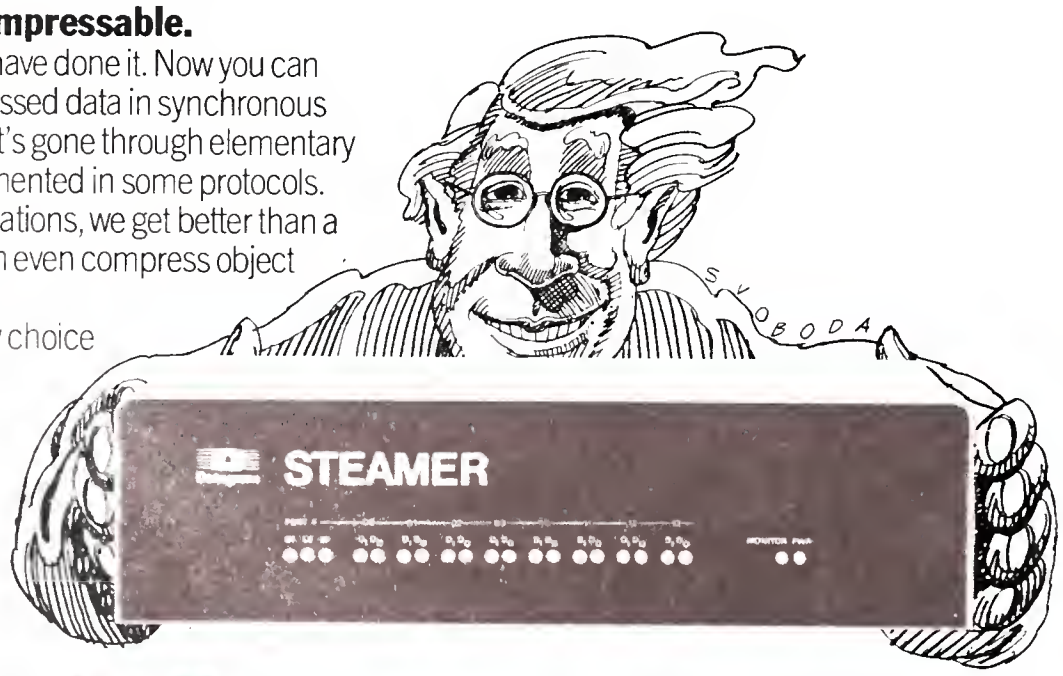

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CHANGE from page 49

your leverage."

Because the PCIC has taken responsibility for all software acquisition, Lunsford said, it recently purchased 600 units of a popular micro software package, which retailed for $650, for only $122 a copy — even though the federal General Services Administration had worked out a "best price" of $470 with the vendor.

"Bulk acquisition opens up a new door — a most important door for information centers. Don't leave acquisition to users, vendors or attorneys. Take the lead," he said. "Because we have standardized, we can predict demand and buy in bulk."

Lunsford said the information center manager can work with vendors to overcome some nagging issues. Those issues involve the handling of warranties, distribution of backup diskettes and updates or fixes, and authorized copying of software.

"You should not have to fill out 500 warranty cards when you buy 500 packages," he said. "Also, the vendor cannot tell you the software can't be moved. You can't agree to run it on only one machine. In addition, you should not have to distribute 500 backups after you have already installed the originals. The original and backup should come in one package. The vendor will meet your needs in these areas, but only if you communicate them."

Special support consideration

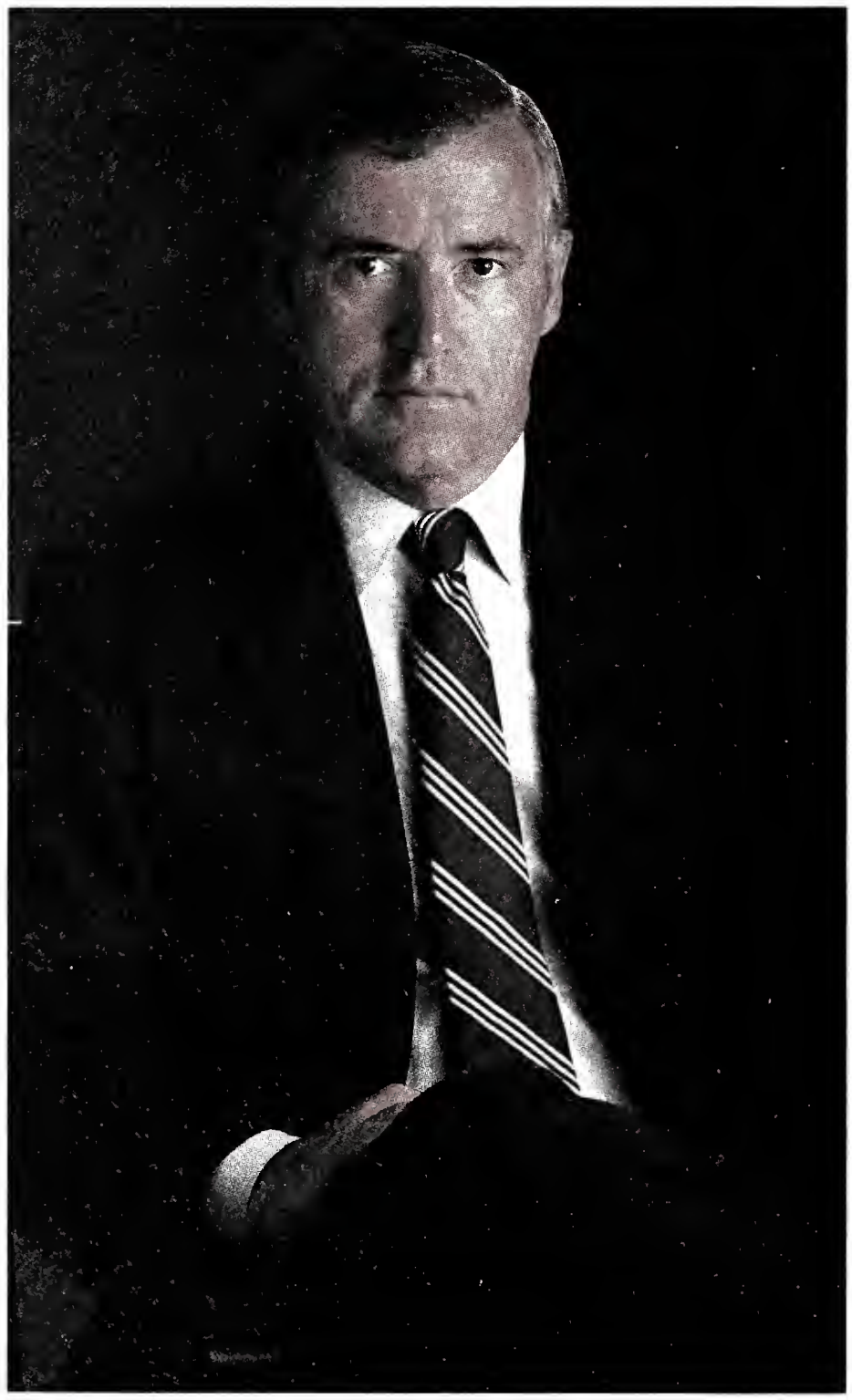
By handling the majority of user problems with software — reducing the vendor's work load — the information center should also get special support consideration. "You are stopping 99% of user calls. But when you have to make that one hot line call to the vendor, you get put on hold for an hour. Vendors should serve you better. They should set up a special information-center-oriented hot line. You can only arrange that kind of relationship contractually and only if you request it."

Lunsford said information center managers must also communicate to vendors their concerns about so-called lock-and-key protection schemes and shrink-wrap licenses, both of which pose problems for large organizations.

"Vendors are looking to keys, and information centers can't deal with that. It can't be managed. Shrink-wrap laws are also a problem because a national organization could face as many as 50 different laws."

Straight talk about application software packages.

"Most application software packages are functionally rich. The problem is, that's simply not enough."



While everyone agrees that packaged applications possess great potential to save time and money, you'll hear a lot of people—from MIS directors to operations managers—tell you the ones their companies have implemented fall somewhere short of satisfactory.

Typical limitations include the fact that the packages require such extensive modification that the savings they seemed to offer totally disappear. Another common complaint is that one application package fails to integrate with another. A third shortcoming, and perhaps the most common, is that packaged applications cannot be easily adapted to reflect the changing nature of the business.

You have only to look at the architecture of most of the applications currently in use to understand why these problems exist.

Many companies today depend on applications designed with technology from the 60's and 70's. Some are 2nd generation applications built without any reliance on database architecture. Others are 3rd generation applications that provide only a generalized *interface* to a database management system; in addition, many application vendors provide a common front end user interface to mask inefficient architecture. The result is that these 3rd generation applications realize only about 10% of the power of a DBMS. *And that's simply not enough.*

Without full use of the facilities of a superior DBMS, users of application software find it extremely difficult to adapt and extend an application package to their current as well as to their future business needs. And *only* when an application is built with advanced database technology can it provide the sharing of data that leads to functional integration between different application modules.

Ultimately, what's required is software that goes beyond the conventional packaged applications approach.

What's required is 4th generation applications software—software that's rich in functionality, and whose underlying architecture is built on, and takes full advantage of, advanced database technology.

Fourth generation application software is created using a comprehensive application development facility combining a fourth generation language and end user query and reporting facilities with an integrated data dictionary. Furthermore, fourth generation application packages are functionally integrated, sharing common data between independent modules. This creates an environment to easily adapt and extend an application package, and provides realtime access to all information.

Only fourth generation application software packages enable a company to realize the full potential of packaged applications.

It is clear, therefore, that all application packages of the future will be built using this technology... because it doesn't make sense any other way.

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Chairman of the Board

The only applications worth buying are 4th generation applications.

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2. Functionally Integrated

Businesses today demand applications to do more than address individual functions. Businesses today need applications that recognize the interdependencies within an organization—in short, applications that can share data. For example, efficient real-time, four-way matching of invoices with receiving, purchase and inspection documents can only be achieved through true sharing of data, and this sharing of data can only be achieved with an advanced database technology which delivers that integration. Redundancies are eliminated and productivity is increased when all applications dynamically reflect the operations of the organization. By sharing an architecture that provides for optimum use of an organization's information, Cullinet's manufacturing, financial, human resources and banking applications fulfill this need.

3. Easy to Tailor

Although many businesses appear on the surface to operate in a common fashion, each, in fact, is unique. Applications must therefore be built with an optimized set of tools that permits them to be adapted to a company's way of doing business, rather than having the company have to adapt to accommodate the software. Cullinet applications are designed to accommodate change. They provide the means to personalize screen layouts, capture new information, reformat reports, resequence transactions, and change messages without impacting the entire environment. Only Cullinet's applications can provide this environment for adaptability through their integration with advanced database technology. In this way, Cullinet applications give users the independence to adapt them—quickly and efficiently—to meet the unique requirements of the business.

4. Easy to Extend

As a business changes and grows, so do its needs and requirements. Cullinet provides easy to use, menu-driven facilities that permit functional extension of an application while preserving integration. An end user can quickly react to new requirements by prototyping an application functionally, developing new reports and performing ad hoc queries immediately. MIS can efficiently develop new, associated applications sharing common data and built utilizing the existing architecture. The Cullinet architecture segments the program logic, edit and validation criteria, as well as the security and recovery process, and therefore the complexity of creating new application functionality is significantly reduced.

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Access to all corporate information is key to any application. Because all pertinent data must be available to the analyst and decision maker, easy access to that data, *no matter where it resides,* is mandatory. Your need for information naturally crosses applications boundaries. The ability to associate detailed information about sales orders, finished goods status, and customer credit processing before release of shipments is a prime example. Only by means of Cullinet's applications, which are completely integrated with our Information Center Management System are you provided the opportunity to create an information center that is functionally complete, meeting the information needs of the company as a whole and meeting the specific needs of the operational units of the organization. Each center of functional activity within your organization is served by the system through your mainframe or PC with GOLDENGATE software. Each has access to all corporate information. Accessibility to all information—whether it's in your mainframe, in a departmental minicomputer system, or in your personal computer—makes it readily available to you for analysis through Cullinet's complete information environment.

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COMMUNICATIONS

WIRETAP
Daniel Minoli

Defining budget terminology

SECOND IN A THREE-PART SERIES

A few years ago the processing resources of a typical corporation might have included a multimillion dollar computer and a few thousand dollars worth of communications equipment. Today that CPU complex is often augmented by a multimillion dollar communications network.

When the total expense for data communications was a few thousand dollars, the data communications manager could get away with simple and intuitive financial decisions. Now, due to the figures involved, the communications manager must become increasingly knowledgeable about financial theory.

Some basic terms needed to formulate decision models for comparing alternative strategies are defined below. These concepts, together with those defined in last week's column, will be employed next week for two specific buy/lease examples. Terms required to make such formulations include the following:

■ Present value. This is the value of money at the present time, even if the money is due at some future point. Because of inflation, the opportunity to invest the money and earn interest and the uncertainty of the future, money in hand is more valuable than the promise of cash a year down the road.

For example, the present value of a pension is very small. Participants in a pension pool do not know if they will live long enough to collect, if they will quit before they are vested or if the company will go out of business before they are vested; thus money in hand today is more valuable and sure. The same concept applies to business cash flows. Hence a network enhancement that promises to return $1 million in one year is better than an alternative that promises to return $1.05 million in two years.

■ Future value. This is the value of money at some future point. For example, $1 invested at a compound rate of 10% would be worth $2.59 in 10 years. However, the future purchasing power of that dollar will be the same as it is today unless the rate of interest earned exceeds the rate of inflation.

■ Lease. A lease is a contract between a lessor and a lessee, whereby the lessee pays a fee for the use of a resource owned by the lessor. The fee is usually paid monthly and involves a fixed prenegotiated charge.

■ Net lease. This is a lease under which the lessee pays for all maintenance and upkeep of the asset.

■ Third-party lease. Also called a leveraged lease, a third-party lease is an ar-

See **FINANCE** page 62

Minoli is an associate vice-president, systems planning and engineering, of Prudential-Bache Securities, Inc. in New York.

DATA STREAM

AT&T, offshoots trim the fat

By John Dix
CW Staff

Monopolies are fat. Particularly government-regulated monopolies.

It comes as no surprise that AT&T has had to pare roughly 20% of its work force. Before divestiture, AT&T had more employees than the population of Louisville, Ky. Its revenue was roughly the size of Norway's gross national product. It had more assets than the combined top three U.S. industrial companies.

Now splintered, each of the resultant eight fragments foraging in new and often competitive markets, AT&T and the seven regional Bell holding companies have to slim down to survive.

While no one predicted it, divestiture has been hardest on AT&T. Facing dismal first-year earnings that fell far below expectations, AT&T cut 11,000 jobs in 1984. The latest round of cuts — roughly 24,000 jobs — brings this year's list of casualties close to 26,000.

The divested Bell operating companies have, conversely, fared well financially. This has stemmed the need for personnel cutbacks but not obviated the need to trim fat.

A maintenance supervisor for one divested Bell operating company recently admitted that cost control has become so stringent that employees have to sign for pens. The consciousness has spread throughout the company.

Inventories of equipment have been cut. Before divestiture the maintenance division this supervisor worked for used to keep 60 days' worth of cable and wire in its yard. That is, it would take the operating company crew 60 days to lay all the cable it had on hand at any one time. Now the company's crews keep eight and 10 days' worth of cable inventory on hand.

> *A maintenance supervisor for one divested Bell operating company recently admitted that cost control has become so stringent that employees have to sign for pens.*

Management is being spread thinner. While supervisors at this employee's company once managed seven or eight people, those same individuals now oversee twice as many employees.

Truck fleets are being reassessed. This supervisor's company keeps a fleet of maintenance trucks that is 6,000 strong. Many of these trucks get only 10 miles per gallon of gasoline. New trucks the company is studying could get 17 miles per gallon.

These cost-cutting measures, coupled with sound financial results, have spared the employee cutbacks that are plaguing AT&T. But former Bell operating company personnel aren't dillydallying under the impression that job security is what it used to be. "One of the reasons people used to join the phone

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■ Crosby Lyhus has introduced a personal computer software package that works with Rolm private branch exchanges/**62**

■ Data Switch's switching and control products now support IBM and IBM-compatible diagnostic modems/**62**

■ Dataprobe has announced an addition to its Fallbacker II family of dial back-up equipment/**62**

INSIDE

Voice/Data Communications/**62**

Multiplexers/ Modems/**62**

Barcode Industries introduces scanner

GREAT NECK, N.Y. — Barcode Industries, Inc. has announced a bar code scanning system that supports up to 16 readers and connects them to a single RS-232C computer port.

The master MR-Net unit supports readers on a single RS-422 data communications line. The master unit can be supported on any RS-232C computer interface. The MR-Net master unit is preprogrammed to poll the slave readers, which have switch selectable addresses.

The reader units can be either light pens or hand-held laser scanners, Barcode reported. Both of the units are available with or without displays. Reader units with displays can receive and display messages from the computer. Maximum distance between the master and the last reader on the RS-422 line is approximately 3,000 feet.

MR-M master costs $720, as does the MR-3 slave equipped with a Barpen light pen without display. The MR-2 Barpen with display costs $920. Either of the former costs $1,500 more with an SP hand-held laser scanner.

The products are available immediately after the receipt of order.

Barcode is located at 17 Barstow Road, Great Neck, N.Y. 11021.

DG's intelligent controller out

WESTBORO, Mass. — Data General Corp. recently announced an interface that enables its Eclipse MV family of minicomputers to connect to Net/One broadband local-area networks produced by Ungermann-Bass, Inc.

The intelligent broadband controller is a 15-in. board that mounts internally in MV series processors. It has 256K bytes of random-access memory, a Microeclipse processor, a serial I/O section and a data channel interface. The board connects to IEEE 802.3-compatible broadband Net/One through an Ungermann-Bass broadband modem.

According to the company, the intelligent broadband controller completes a marketing agreement between the two companies that was reached in January.

Under the terms of that agreement, Ungermann-Bass sells to DG customers an array of components for use with its Net/One network, including the cable, head end and modems.

The intelligent broadband controller is available 90 days after receipt of order for $6,500.

Net/One is available from Ungermann-Bass, which is located at 2560 Mission College Blvd., Santa Clara, Calif. 95050. DG can be reached at 4400 Computer Drive, Westboro, Mass. 01581.

COMMUNICATIONS

VOICE/DATA COMMUNICATIONS

■ **Crosby Lyhus, Inc. has introduced Comcop, a personal computer software package that enables users to manage Rolm Corp.'s private branch exchanges.**

Comcop runs on the IBM Personal Computer and creates telephone extension profiles by class of service, call forwarding characteristics, pick groups and hunt groups, the vendor said.

Standard reports, which can be printed or generated on-line, include user profiles, move and change orders, problem reporting, extension profiles, organization directories and system speed. The software also provides an on-line attendant directory for use by the switchboard operator.

Comcop VS for use with Rolm CBX II's with fewer than 144 extensions is licensed for $1,500. Comcop for more than 144 extensions is priced at $5,000.

Crosby Lyhus, 40 Bedford Road, Armonk, N.Y. 10504.

■ **Data Switch Corp. has announced that its switching and control products now support IBM and IBM-compatible diagnostic modems.**

The Data Switch XY-MAX Model 2840-II and Model 2810 digital matrix switches can now support the transmission signals required by IBM's diagnostic modems to perform problem isolation and correction procedures, the vendor said. No special cabling is required.

The Data Switch XY-MAX Model 2840-II costs $175,000 for support of 256 by 256 RS-232 lines. The Model 2810, which supports 64 digital and 64 analog lines, costs $49,100.

Data Switch, One Enterprise Drive, Shelton, Conn. 06484.

MULTIPLEXERS/MODEMS

■ **Televell has announced the Dial-Up Port Expander (DPE), an analog device intended to enable a mainframe port and a synchronous modem to support five dial-in lines.**

The DPE sits between a modem and the outside dial-up lines. The product is compatible with IBM 3270 or 5251 protocols and any half-duplex, synchronous dial-up modem up to 9.6K bit/sec., according to the vendor.

Five remote cluster controllers or cluster controller emulators can dial in to the DPE simultaneously, using the 5251 or 3270 protocols, the company said.

The DPE is priced at $4,500.

Televell, Suite 104, 1901 Embarcadero Road, Palo Alto, Calif. 94303.

■ **Dataprobe, Inc. has announced an addition to its Fallbacker II family of dial backup equipment, the Fallbacker II Two-Call Dial Back-Up switch.**

The switch is now available in a high-density rack mount, allowing dial backup of up to 16 leased lines in a 5¼-in. rack space. The initiating switch card allows the transfer of a leased-line modem from the four-wire line to two dial lines.

The price for the LIS-RV model local initiating switch rack-mounted card is $315, and the LIS-R-16 model 16-position card rack costs $325.

Dataprobe, 110 W. Palisades Blvd., Palisades Park, N.J. 07650.

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company was for job security," the supervisor said. "People are more apprehensive."

This apprehension is well founded. Although AT&T has a virtual monopoly on long-distance services, it faces competition on more fronts than do the divested Bell operating companies. AT&T, for example, is no longer the only game in town for an array of services.

The largest threat the divested Bell companies face, on the other hand, is bypass. Although very real and potentially crippling, bypass is not as well advanced as the competition is in AT&T's markets. Realizing this, the former Bell operating companies are trying to head that threat off at the pass by exploiting new technologies like fiber optics.

Regardless of the measures taken, it is clear that AT&T and the former Bell operating companies still face an uphill climb as they strive to shed the complacency bred from years as a government-controlled and protected monopoly.

FINANCE from page 61

rangement under which the lessor borrows funds to cover part or all of the purchase price of the asset or equipment. A third party owns the equipment. Sometimes a firm buys the equipment, sells it to the third party and then leases it back.

■ Sale and lease back. As described, sale and lease back is an arrangement under which the user of the asset sells the asset and then leases it back from the purchaser.

■ Salvage value. Also called residual value, salvage value is the price that the firm can receive for an asset after it has been used for an extended period of time.

■ Payback period. The interval required for an asset to generate enough cash flow to cover the initial outlay for that asset is its payback period. For example, an asset costing $15,000 that generates an after-tax cash flow of $5,000 has a payback period of three years.

■ Break-even point. This is the level at which inflowing cash equals the cost of the investment, namely, earning a zero profit on a given project or investment.

■ Capital gains or losses. The difference between the original cost of an asset and its selling price is a capital gain or loss. Capital gains or losses are realized only after the asset is sold.

Next week we will apply these and last week's concepts to problems confronting managers faced with the task of evaluating and acquiring data communications equipment.

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SYSTEMS & PERIPHERALS

Scientific processor upgraded

BEAVERTON, Ore. — Floating Point Systems, Inc. has announced the FPS-364, a replacement to its FPS-164 scientific processor.

The FPS-364 reportedly offers the performance of the original scientific-oriented processor at a 60% weight reduction, 50% reduction in noise level and lower power requirements. The FPS-364 is compatible with all levels of FPS-164 applications software and systems software.

The FPS-364 is said to handle the scalar and vector operations typical of large Fortran programs and to relieve a general-purpose mini or mainframe computer of scientific processing tasks. The FPS-364 features high-speed, 64-bit architecture and up to 72M bytes of main memory.

The FPS-364's optimizing compiler works with Fortran 77 programs. Floating-point operations are performed using pipelined 64-bit computational units.

With peak speeds of 11 million floating-point operations per second and 15-digit precision, the FPS-364 reportedly offers high performance on structural analysis, design automation, oil reservoir simulation and computational chemistry applications.

More than 40 applications programs are available on the FPS-364, and it is compatible with IBM, Digital Equipment Corp., Apollo Computer, Inc. and Sperry Corp. environments.

The FPS-364 is priced at $298,000 with 4M bytes of memory, one FD64 controller, an 800M-byte disk drive and the SJE operating system and program development software.

Floating Point Systems is located at 3601 S.W. Murray Road, Beaverton, Ore. 97005.

Minis complement net of systems, report says

By Donna Raimondi
CW Staff

FRAMINGHAM, Mass. — Despite the growth of increasingly powerful microcomputers, minicomputers still garner their share of the departmental end-user market, according to a market research report released recently.

Methods for managing minicomputers involve staff, equipment and data concerns, according to International Data Corp. (IDC), a research firm based here that published the report titled "Minicomputer Applications in End-User Departments."

Companies increasingly are finding that a combination of mainframes, minicomputers and microcomputers help them perform all of their computing needs, the report said.

For small businesses and decentralized corporations, traditional minicomputers have a legacy of business applications that has yet to be equaled by microcomputer software, IDC noted.

Minicomputers in a department can complement a network of microcomputers by serving as a host for departmental data bases and as a gateway to corporate mainframes, according to the research memorandum prepared for IDC's Continuous Information Services Clients.

Minicomputers are small- and medium-scale computer systems, according to IDC's classification system, which lists four categories of processors — large-scale, medium-scale, small-scale and personal computers.

Medium-scale machines are typified by the Digital Equipment Corp. VAX-11 products, Data General Corp. MV products,

See **REPORT** page 70

Secure Xerox workstation out

EL SEGUNDO, Calif. — Xerox Corp. has announced the 1108-105T artificial intelligence workstation, which meets federal standards for secure installations.

The workstation is compatible with Ethernet local-area network and joins the Xerox line of Secure Information Device print, file and communications servers, a spokesman said.

Secure Information Device accreditation was established by the National Security Agency to prevent classified information from being leaked in the form of electronic signals. The specification sets a limit on the strength of such signals emitted by equipment used for classified applications.

The workstation's 42M-byte rigid disk is transportable. The Xerox 1108-105T includes the company's Interlisp-D programming environment designed for coding AI applications. The 1108-105T with 1.5M bytes of main memory, 8M bytes of virtual memory and a 137-nsec cycle time is priced at $34,950.

Xerox also announced that the 1108 series of AI workstaions can now interface with the IBM Personal Computer, IEEE 488 and Intel Corp.'s Multibus-compatible peripherals with the Busmaster option. The Busmaster option, which includes a workstation card and software, enables workstation users to incorporate a variety

See **XEROX** page 67

■ California Computer Group introduced a 1G-byte disk subsystem and a tape system for the Digital Equipment Microvax/**66**

■ Preston Scientific announced that its PMC analog-to-digital subsystems now can interface with Masscomp MC-500 minicomputers/**67**

■ International Imaging Systems released an image processor for applications ranging from cardiovascular imaging to military surveillance/**67**

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Don't count on IBM to stop the slump

HARD TALK
Tom Henkel
CW Senior Editor

The rumor mill was abuzz the week of Aug. 19. IBM was going to announce something — that seemed to be common knowledge — but what?

The list of possibilities was impressive. Some said IBM was going to unveil an array processor for the 3090 series of mainframes. Others said they believed that IBM would announce new models of its 3090 — the Models 100, 150 and 600, as they were called.

Still others said the time had come for the long-awaited IBM token-ring networking scheme to make its debut.

Aug. 19 arrived, and IBM dutifully made its announcement — two modems and a graphics printer for the Personal Computer, a series of service discounts for the Personal Computer and a nebulous statement that the Watson Research Center is interested in parallel processing. So what?

Big Blue letdown

Hopes were high that IBM would do something to brighten the doldrums of a yawner of a summer. Big Blue let us down. Let's face it, two modems and a printer are not the much-needed spark to blast the computer industry back into a prosperous orbit.

Just as fans look to superheros to rally the home team to a come-from-behind win, the computer industry seems to be depending on IBM to do something to pull the industry out of a nagging slump. But does IBM really have a responsibility to toss a life ring to hurting computer companies?

After all, IBM is probably just as much to blame for the slump as any of the other factors that have been bandied about as the cause of these dismal times.

IBM had the nerve to post two lousy quarters in a row. This was an unimpressive feat that seems to have thrown much of the rest of the computer industry into cardiac arrest.

So to make up for it, why shouldn't IBM announce a series of important, strategic products in the worst part of a "barfo" year just to get the industry back on track?

Be serious. IBM is a multinational corporation, not a pitcher for the New York Mets.

Nowhere in the Big Blue rule book is there any mention of a responsibility to serve as savior to the industry.

IBM is going to plod along doing what it has done so well for the past 50 years — survive, dominate and make a ton of money. IBM is only concerned about one thing: what is best for IBM. The rest of us are on our own.

Apollo cuts service fees

CHELMSFORD, Mass. — Apollo Computer, Inc. has announced a 20% reduction in hardware maintenance service charges for its line of Domain workstations, server processors and peripherals.

The company also announced a 16% reduction in monthly maintenance charges for its DN460 workstation that includes 4M bytes of memory.

Maintenance on the DN460 is now $449.

Monthly service fees for Apollo's DN660 with 4M bytes of main memory have been reduced 15% from $687 to $583.

Apollo has also added a service program that gives customers four-hour, on-site response and optional weekend, holiday and extended weekday coverage for all hardware products.

Apollo Computer is located at 330 Billerica Road, Chelmsford, Mass., 01824.

Save the

Millions of IBM PCs and compatibles are fighting for their lives.

Because users are demanding more and more storage space.

For bigger programs. For more applications. For downloading from the mainframe to the micro.

It's really more than a little PC can cope with.

Which is why a lot of people are replacing their PCs with XTs.

But now you can put an end to this senseless economic waste.

And save your company the massive cost of buying all those XTs.

With Hardcard.

A 10 megabyte hard disk drive on a card that makes a PC* function exactly like an XT. In fact, the only difference is that Hardcard has a faster access time than the XT's built-in drive.

It's also faster to install than any other add-on drive. Because everything is compressed onto a single card that quickly plugs into any expansion slot inside the PC. Which means you can rescue hundreds, even thousands of PCs in a day.

And with Hardcard's special installation software, your users can load the operating system and be ready to install their programs in minutes. Which saves your technical staff a lot of support time.

Hardcard also saves all that money you've invested in software. Because it runs all the most popular programs exactly like an XT would. With no extra fuss or modification. And its built-in file directory lets users arrange their files anyway they'd like. So they can boot up any application at the touch of a key.

As for reliability, there's simply less to go wrong. Because Hardcard has fewer parts than other drives. And absolutely no cable connections. Which makes it twice as reliable as the XT's built-in drive.

And Hardcard is the only add-on drive that lets your users keep both their floppies up and running.

But perhaps the most reassuring thing about this revolutionary

PCs.

concept is that it is based on totally non-revolutionary technology: the Winchester hard disk.

In fact, Hardcard was created by some of the same people who pioneered the 8" and 5¼" Winchester drives. And their company has a long history of producing reliable drives for some of the biggest computer manufacturers in the industry.

Because of Hardcard's superior reliability, we can offer you a warranty that goes well beyond the usual 90 days. We give you a full year. Should anything go wrong within the year, take it to your nearby authorized service location, and you'll get a replacement Hardcard. Immediately. Which means little to no down time.

And the price? Affordable enough to turn all your PCs into XTs.

Hardcard will be available during October at your local computer dealer. In the meantime, write for more information: Plus Development Corp., 1778 McCarthy Boulevard, Milpitas, CA 95035.

And do your part to save these friendly, intelligent little machines.

*Hardcard is compatible with IBM PC, IBM PC XT, Compaq Portable, Compaq Plus, AT&T PC 6300.

Plus and Hardcard are trademarks of Plus Development Corporation. IBM, IBM PC and IBM PC XT are trademarks of International Business Machines Corporation. Compaq Portable and Compaq Plus are trademarks of Compaq Computer Corporation. AT&T PC 6300 is a registered trademark of AT&T Information Systems, Inc.

Hardcard
from **Plus**

SYSTEMS & PERIPHERALS

DATA STORAGE

■ **California Computer Group has released Micro-XP, a series of disk and tape subsystems for Digital Equipment Corp.'s Microvax.**

The Micro-XP provides up to 1G byte of disk storage, which can be backed up by an 80M-byte removable disk or a 500M-byte Group Coded Recording cache streamer that operates at 200 in./sec.

The Micro XP-5 dual-drive storage system is said to enhance the storage capability available to Microvax users. The product consists of a 516M-byte, 9-in. disk drive with a 20-msec access time. It also has a second 516M-byte optional disk drive that gives users 1G byte of storage, the vendor said.

The Micro XP-5 drives are contained in a 28-in. enclosure that fits under a desk. It can also be rack mounted in a standard 19-in.-wide cabinet.

The product is priced from $13,450 for the 516M-byte version to $24,950 for the 1G-byte version.

California Computer Group, 3303 Harbor Blvd., G-10, Costa Mesa, Calif. 92626.

AUXILIARY EQUIPMENT

■ **Mentor Graphics Corp. has released a general-purpose test fixture for its Hardware Verification System that works with the company's Idea series of engineering workstations.**

The fixture is said to provide universal sockets in place of probe leads. It can be used with any device package including dual-in-line packages, leadless chip carriers and pin grid arrays with up to 20 by 20 pins.

The unit costs $5,000.

Mentor Graphics, 8500 S.W. Creekside Place, Beaverton, Ore. 97005.

■ **Cardamation Co. has unwrapped two punched card peripherals — a card reader and a reader punch — for the IBM System/36 Personal Computer.**

The CT300/31 Card Reader includes a 300 card/min. 80-col. reader, an RS-232C asynchronous interface to the IBM Personal Computer workstation and a software handler on diskette for the IBM System/36 Personal Computer connection. It costs $2,645.

The RP8531 Reader Punch includes a 66 card/min. reader or a 200 char./min. reader, an RS-232C interface and software on a diskette. It costs $6,690.

Rental terms for both units are available.

Cardamation, P.O. Box 746, Frazer, Pa. 19355.

■ **Test & Measurement Systems, Inc. has released a programmable video signal generator for testing and evaluating color and monochrome video monitors.**

The Model VG-804, manufactured by Astro Design, Inc. of Denen-Chosu, Japan, is said to operate at horizontal scan rates up to 99 kHz and dot clock frequencies from 4.38 MHz to 50 MHz. It has both analog and transistor-transistor logic outputs for connection to the monitor under test.

The unit generates vertical and horizontal color bars and gray scales, cross hatch and characters. It costs $5,700.

Test & Measurement Systems, Suite 301, 349 Cobalt Way, Sunnyvale, Calif. 94086.

■ **Industrial Vision Systems, Inc. has unwrapped a 400 dot/in. digitizing scanner that is said to scan paper documents up to 36-in. wide by any length and convert them to a digital raster file in compressed or uncompressed format.**

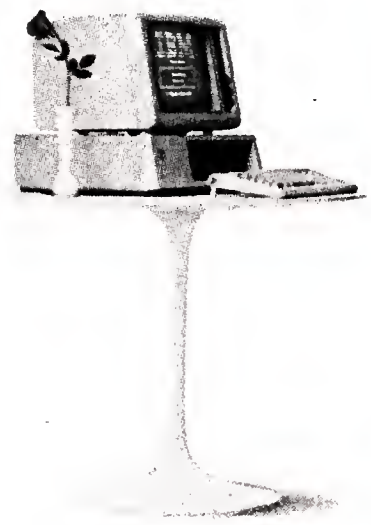
The E/Scan Model ES400 is said to be useful for inputting drawings to computer-aided design workstations or image management systems, performing electronic restoration of drawings or faxing large documents.

The unit costs $79,000. Interfaces are available to connect the scanner to an IBM Personal Computer, a Multibus-based system and a Versatec plotter.

Industrial Vision Systems, 452 Chelmsford St., Lowell, Mass. 01851.

■ **Acrosystems Corp. has released an I/O module for its Acro-900 Intelligent Data Acquisition and Control System.**

Typical applications of the Model 913 include machine on- and off-timing, dig-



IBM's most powerful PC word

IBM DisplayWrite 3.
For small jobs to big ones, from PCs to mainframes.

Whether you're the writer or the typer or both, how you put words to paper should be limited only by your needs, not by your tools.

Which is the whole idea behind IBM DisplayWrite 3.

It's the latest PC version of IBM's DisplayWrite Series; software that works with a variety of IBM office systems.

So it not only turns your PC into a powerful text processor, DisplayWrite 3 goes beyond your PC.

It lets you exchange documents with a big computer, like a properly equipped IBM mini or mainframe.

DisplayWrite 3 is "menu-driven" to make learning fast and straightforward.

It lets you do all the expected things, like centering and justifying and moving text every which way.

Plus a number of highly unexpected things, such as automatic outlining and footnoting.

You can edit parallel columns of

SYSTEMS & PERIPHERALS

ital control and status checking. The unit is a 60-channel digital I/O module. The 60 bidirectional lines may be used as either digital input or output, and the software is programmable on a per-line basis, the vendor said.

The Model 913 costs $695.

Acrosystems, 66 Cherry Hill Drive, Beverly, Mass. 01915.

■ **Hewlett-Packard Co. has released 14 emulation subsystems to expand the processor support capabilities of its HP 64000 Software Design Center.**

The subsystems are said to provide a link between the software development environment and the target system. The emulation subsystem models are for processors that include the Fairchild Camera & Instrument Corp. F9450; Motorola, Inc.'s 68000 (both 64 and 68 pin probes), 68008, 68010 (both 64 and 68 pin probes) and 146805E2; Texas Instruments, Inc.'s TMS32010; Zilog, Inc.'s Z80; Intel Corp.'s 8086/8087, 80C86, 8088/8087 and 80C88; Hitachi Ltd.'s 6301/6303 V series; and NEC Corp.'s 70116 and 70108.

Prices range from $4,100 to $8,800.

HP, 3000 Hanover St., Palo Alto, Calif. 94304.

■ **Preston Scientific has announced that its PMC series of analog-to-digital subsystems is now able to interface to Masscomp's MC-500 computers.**

The PMC series will interface Preston's 1-MHz 15-bit GMAD1A multiplexing analog-to-digital converters to Masscomp's MC500 computers via the Masscomp CSP-50006 customized interface package.

The PMC interface package includes a programmable crystal-based clock, output data memory, channel address memory to control up to 4,096 data channels and front panel off-line control modes.

The PMC interface price is dependent upon system configuration, conversion rate and resolution. Prices typically range from $15,500 to $23,100 for 32- to 128-channel 15-bit 1-MHz systems.

The Masscomp CSP-50006 interface kit is available from Masscomp at One Technology Park, Westford, Mass. 01886.

Preston Scientific, 805 E. Cerritos Ave., Anaheim, Calif. 92805.

■ **International Imaging Systems, Inc. has released its Model 6700 Image Processor for applications requiring data acquisition and simultaneous real-time processing, such as hardware histogram generation for statistical analysis.**

Applications for the unit range from digital angiography and cardiovascular im-

Continued on page 70

processing ever? That's the whole point.

text, then re-edit without a lot of rethinking.

You can print one document while you work on another.

You can produce form letters that seem more like personal letters.

You can check your spelling (with the help of a built-in dictionary) while you hyphenate and paginate in one pass.

You can even process numbers. DisplayWrite 3 can add, subtract, multiply and divide.

And if, after writing an important proposal, you need to change your product's name from Sudso to Sudsy in 156 places, you can, automatically.

To learn more, call your IBM marketing representative, or visit an IBM Product Center or Authorized IBM PC or Software Dealer.

For the store nearest you, and a free brochure, call 800-447-4770. (In Alaska call 800-447-0890.)

IBM

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XEROX from page 63

of color monitors and printers, tape drives and graphics electronic drawing units.

The IEEE 488 access will enable Xerox workstations to support engineering test equipment, speech synthesizers and a variety of measuring devices.

The Busmaster board can be connected to any Xerox 1108 processor with the CPE Expanded Processor Option, containing expanded 12K-byte control store, floating-point processor and parallel I/O port.

The Busmaster option is priced at $3,995.

In addition, Xerox announced that users of the 1100 series of AI workstations can now directly interface their workstations to the Xerox 4045 Laser CP printer. The printer offers resolution of 300 by 300 dot/in., up to 36 type fonts and printing speeds of up to 10 page/min.

Deliveries of the Xerox 4045 CP printer for Xerox AI workstations are scheduled to begin in the first quarter of 1986. The printer is priced at $4,995.

Xerox Systems Group is located at Xerox Centre, 101 Continental Blvd., El Segundo, Calif. 90245.

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For more information
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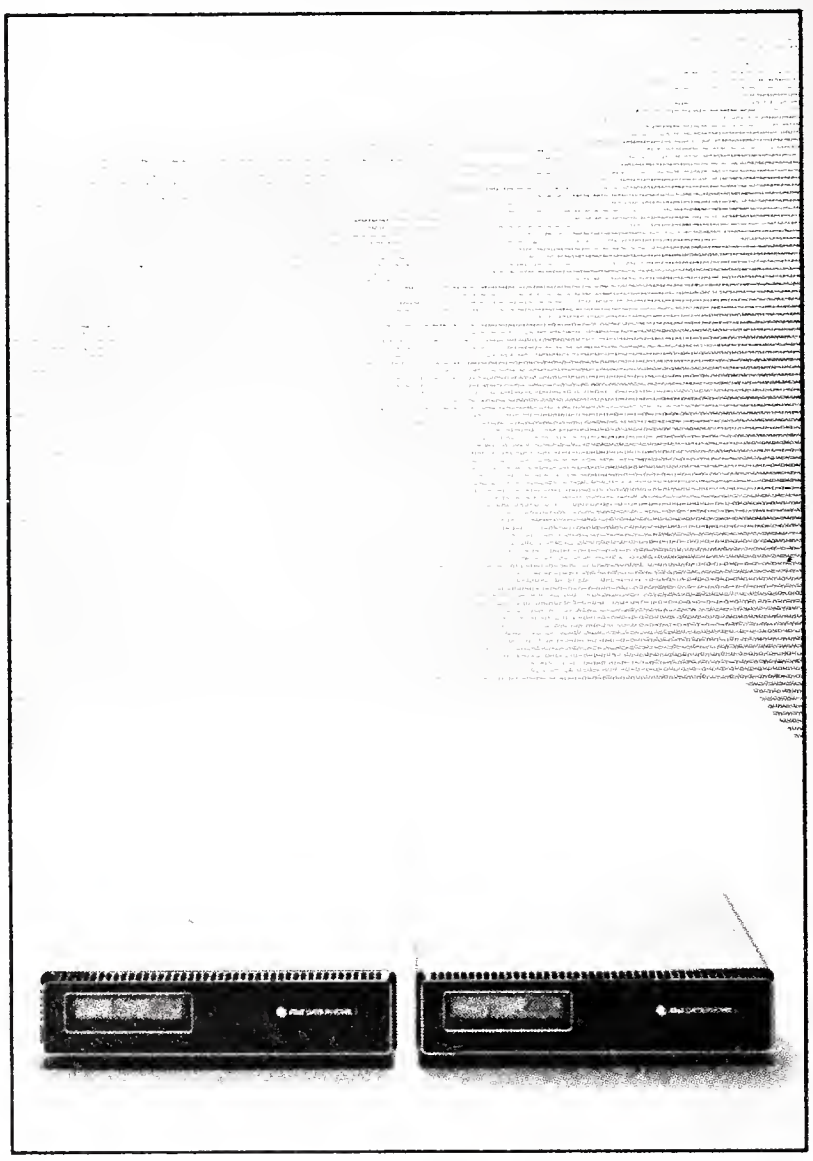
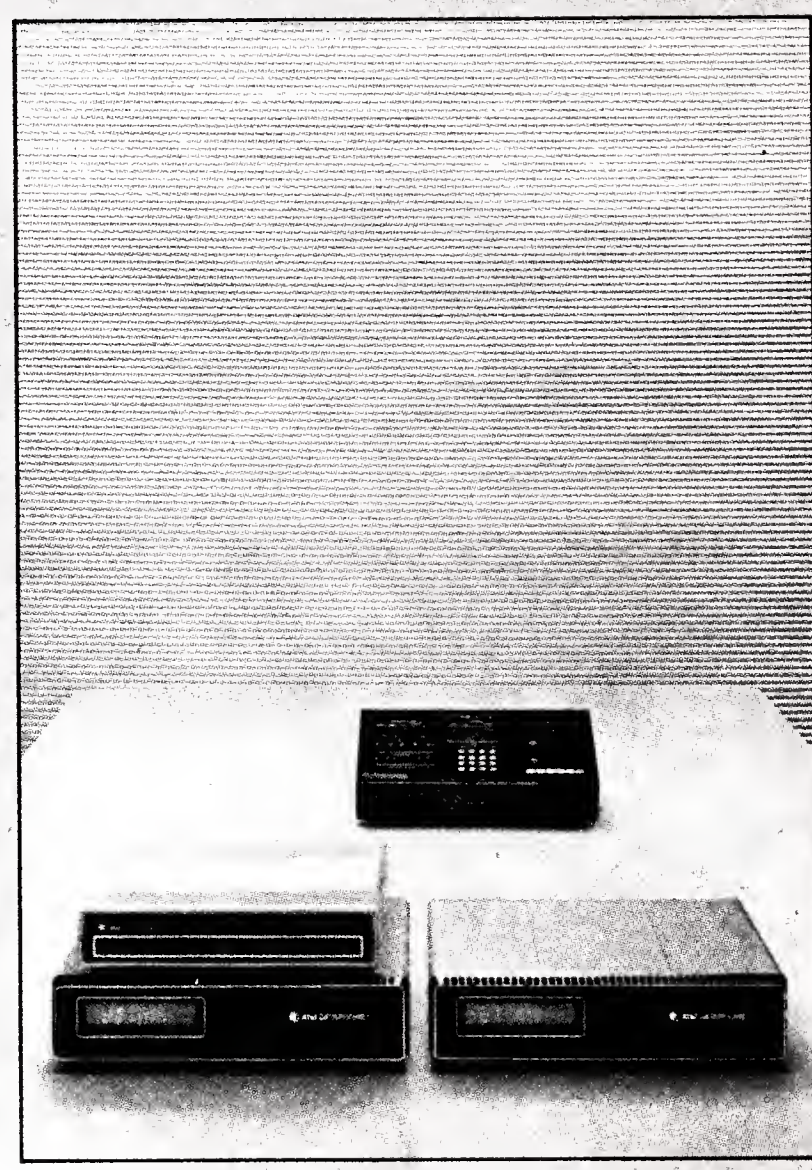
HOW TO KEEP YOUR NETWORK UP AND RUNNING.

THE DATAPHONE II SYSTEM. FROM AT&T.



The basics.



Build on the basics.

Today, you're more dependent on your data network than ever before. You have no time for downtime. You need reliable data communications equipment that can keep your network running strong. That's the DATAPHONE* II System from AT&T.

The DATAPHONE II System is an evolving line of high-performance data communication products—modems, multiplexers, data service units and diagnostic control devices—that combines data transmission with real-time diagnostics and sophisticated network management and control.

It's a modular system of hardworking components, designed to keep your network up and running. And to easily grow in size, speed and diagnostic capability to meet your changing needs.

Whether you have an analog or digital network, the DATAPHONE II System offers a full line of microprocessor based private line modems and data service units to provide reliable transmission and sophisticated diagnostics. These modems are the backbone of our system.

From this base, you can enhance your system in easy, planned stages. You can build an extensive network management system to match your precise needs.

To really get the most of your network, you need to make maximum use of your transmission facilities. The DATAPHONE II System offers a full line of multiplexers to meet that need, and to satisfy both point-to-point and multipoint requirements. They get your data traffic moving fast and minimize line costs. All of these multiplexers work with our analog modems and DSUs. And they connect to our System Controller to give you total network management.

Recent additions to the DATAPHONE II multiplexer line include: The 735 T-Mux, a high-speed, time-division multiplexer for T-1 facilities. The 718 Stat Mux, a statistical multiplexer with unique expansion capabilities. The 719 Networker,

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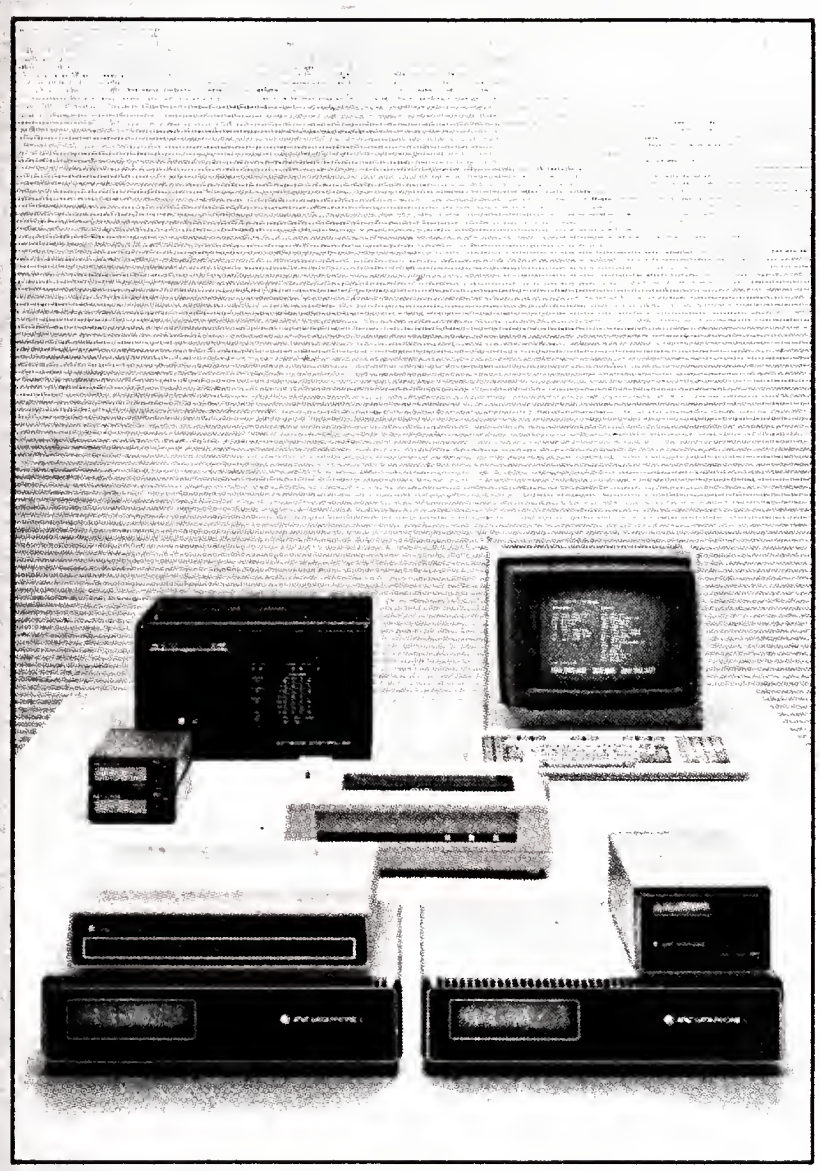
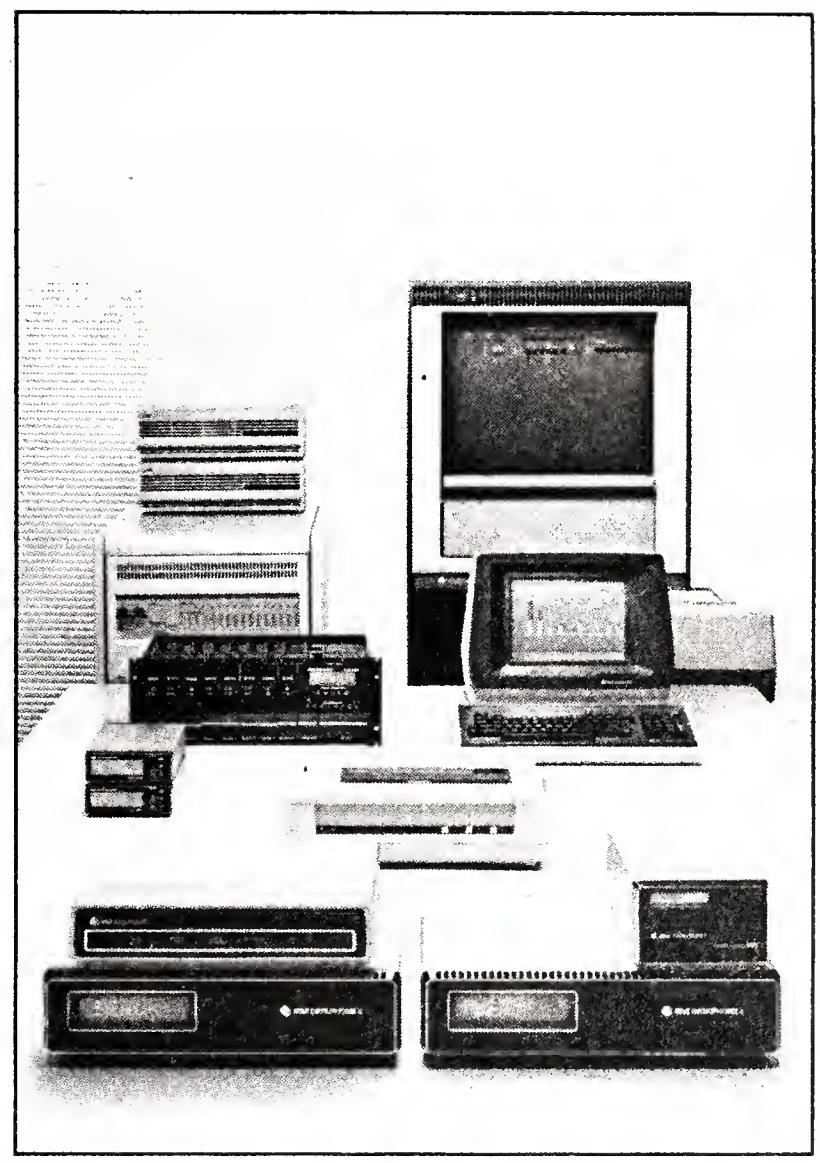


Add on a little more.



Get as big as you want.

a combination of statistical multiplexing and data switching.

We're determined to keep the DATAPHONE II System at the leading edge of technology. That's why we're constantly researching and developing new products and enhancements to keep your information on the move.

Our latest digital product offering includes two new data service units, the 2500 and 2600. The feature-rich 2500 offers quick, on-site, graphic, LCD displays of test and fault reports. The 2600 provides all the features of the 2500 and the added bonus of advanced diagnostics through connectivity to the DATAPHONE II System Controller.

You can be certain a DATAPHONE II System is the right choice, offering the capability you need now with flexibility for the future.

And AT&T backs the DATAPHONE II System with the largest, most experienced sales and service force in the industry. We're available 24 hours a day to provide support and service, to troubleshoot faults and prevent problems before they occur.

To learn how our DATAPHONE II System can meet your needs from start to finish, call your AT&T Information Systems Account Executive. And ask about our flexible purchase and leasing options. Or call 1 800 247-1212 for more information.

AT&T
The right choice.

REPORT from page 63

Hewlett-Packard Co. HP 3000 machines and the IBM 4300 series and range in value from less than $60,000 to approximately $1 million, according to the report.

IDC said that small-scale computers traditionally range from 16-bit multiuser systems to small business machines. Typical systems include the Altos Computer Systems, Inc. ACS 68000; Plexus Computers, Inc.'s P/60, DEC's PDP-11/34 and the IBM System/34.

Minicomputers can be characterized as having either 8-, 16- or 32-bit word lengths, from 0.1M to 32M bytes of main memory, bus architecture and an overlapped processing type — as opposed to parallel processing in a mainframe and serial processing in a microcomputer.

Minicomputers excel in time-sharing and in applications requiring distributed processing, IDC noted. Typical minicomputer uses include data base management, front- and back-end processing, data communications, data collection and validation, materials handling, industrial control, manufacturing and engineering tasks and office automation.

Several disadvantages

Departmental users are finding that microcomputers have several disadvantages when compared with minicomputers, the report said. Personal computers might not have adequate storage for departmental data bases, while most microcomputer-oriented local-area networks have primitive operating systems that do not automatically protect data with record lockout as they are updated, the report said. Microcomputers also lack the ability to back up data with a centralized procedure, the report added.

Data processing is evolving to the point where companies have a mixture of the three kinds of computers — mainframes, minis and micros. As this approach to computing takes hold, organizations must learn to manage and control the resources associated with each system, IDC said.

Staff, equipment and data are the three major resources in a minicomputer environment, the report said. Staff is needed to manage the installation, to develop programs and to operate the equipment. A major staff-related function is training, for DP staff as well as for end users.

Management of equipment demands an evaluation of performance, capacity planning and maintenance of the equipment. Data management requires procedures that guarantee the accuracy and validity of the data, controlled access to the data and backup and recovery procedures for the data.

Auditing minicomputers — being able to reconstruct a transaction — requires documentation of operating procedures and programs and a log for operations and daily transactions, according to the report. Management must specify responsibilities for computer programming, operations, data authorization and output use and should consider separating these functions to protect the organization from computer fraud, the report said.

Physical security of equipment

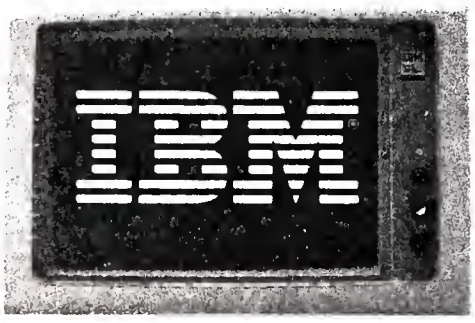
Another function in minicomputer management is the physical security of the equipment, programs and data. Access should be limited, and changes should never be made to production programs. Data in both read and write modes should be protected from unauthorized access.

Finally, plans must be made to correct mistakes and to repair equipment so that operations can continue despite errors and malfunctions within the system, the report said. The system should be designed so that erroneous data is detected and corrected in a timely fashion. This function includes having proper backup procedures, logs, maintenance contracts and spare parts.

The company should have a disaster recovery plan in the event that everything goes wrong, the report said. There should be a method established to recover data and programs and an alternative arrangement made for processing equipment.

More information can be obtained from IDC, Five Speen St., Framingham, Mass. 01701.

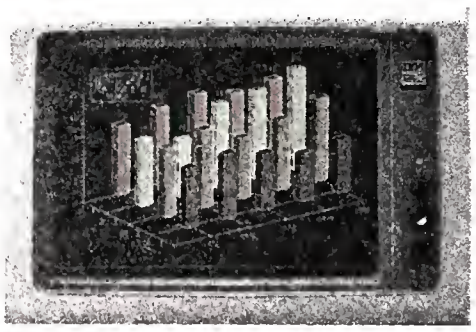
Now playing on the Forte Network:



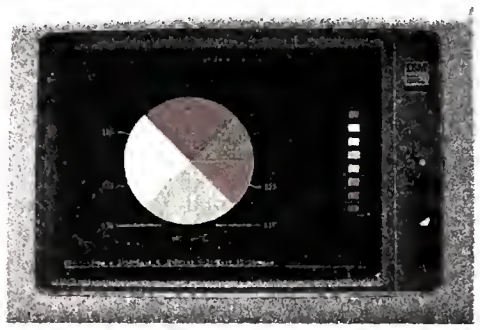
Forte PJ™ The soft-loaded 3278/79 emulator for PCs. A powerful core product with IBM® compatible file transfer support. You can add mainframe graphics, 3270PC and more features as you need them.

Forte 3270PC™ A smarter desk on a disk. The power of IBM's 3270 PC with a simple software upgrade of the Forte PJ. You can "hot key" between host and mainframe windows, and do up to four concurrent file transfers.

ForteNet™ CMS-TSO host software with menu-driven transfers of binary and text files in either direction. Considered one of the industry's fastest software packages.

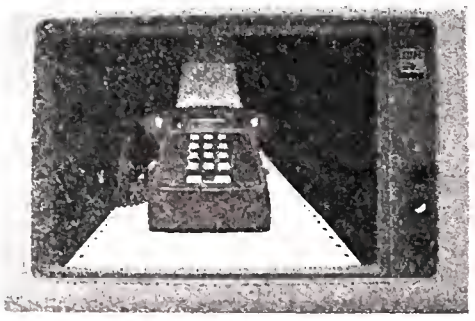


ForteGraph™ The first link to put IBM mainframe graphics on the PC. Add it to Forte PJ. Supports GDDM,® SAS/GRAPH® and TELLAGRAF,™ and IBM's host file transfer support.



ForteGraph (for IRMA)™ The graphics power of ForteGraph for IRMA™ users. Plus compatibility with ForteNet host file transfer software.

ForteLink SNA™ A remote 3274 controller in your PC. Handles up to five concurrent sessions. Like PJ, it supports TopView™ and ForteNet file transfers.



ForteCall TTY™ 3278/79 emulation for remote ASCII terminals. Just dial into your PC to reach the mainframe via PJ. **FortePrint**™ Software for PJ that turns your PC printer into a 3287.

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THE FORCE IN MICRO TO MAINFRAME

Continued from page 67

aging to military surveillance and radar/infrared imagery.

The Model 6700 is said to accept digitized video at up to 13.5 MHz from various input sources supplying synchronization and data clock signals. The unit offers a 16-bit bidirectional port. It has a maximum capacity of 16M bytes of image memory.

The basic unit — comprised of an interprocessor controller, synchronous controller, I/O matrix switch and video pipeline/graphics processor costs $27,950.

A typical version with 70K bytes of image memory and a high-resolution output unit added to it costs approximately $70,000.

International Imaging Systems, 1500 Buckeye Drive, Milpitas, Calif. 95035.

"I called you all together today in order to figure out the instruction manual for my new personal computer."

COMPUTER INDUSTRY

U.S.-Japan chip dispute heats up

System vendor tensions eased by ending of duties

By Clinton Wilder
CW Staff

WASHINGTON, D.C. — Trade tensions between U.S. and Japanese semiconductor manufacturers heated up last week, while the tensions between computer system makers in both countries showed signs of easing.

At press conferences here and in San Francisco last week, the Japanese chip makers' trade group angrily denied allegations of trade barriers recently made by the U.S. Semiconductor Industry Association (SIA).

A spokesman for the Electronic Industries Association of Japan (EIAJ) called the SIA's allegations a "red herring" and claimed U.S. vendors hold a larger share of the Japanese semiconductor market than the Japanese do in the U.S.

The EIAJ announcement came just three days after Japan and the U.S. announced they would remove import duties on various types of computer hardware. Japan will remove its 4.9% duties on computer systems and parts and its 6% duty on peripherals, while the U.S. will drop its 4.3% duty on parts. The U.S. will retain duties of 4% on peripherals and 4.3% on systems.

"Our companies are most pleased by this agreement," said Oliver Smoot, executive vice-president of the Computer and Business Equipment Manufacturers Association. "We interpret it as reaffirming Japan's commitment to further open its market to foreign competitors."

But the war over semiconductor trade practices appears more intense than ever. In the EIAJ response to the SIA complaint, EIAJ spokesman Tomihiro Matsumura charged that U.S. chip makers are using Japan as a scapegoat for their poor performance during the industry's deep slump.

"A single segment of the U.S. semiconductor industry is exploiting general trade tensions in an attempt to seize a guaranteed share of the Japanese market," according to Matsumura, senior vice-president and director of NEC Corp. "The Japanese semiconductor market has been completely liberalized for trade and investment for over a decade."

The SIA recently filed a complaint with the Office of the U.S. Trade Representative under the Trade Act of 1974, charging the Japanese government with discouraging Japanese firms from making purchases of U.S.-made chips. In conjunction with the EIAJ's formal response filed with the Trade Representative's office last week, Matsumura said the complaint "has no basis in law or reality" and fails to cite any Japanese government acts that could be interpreted as trade barriers.

"SIA simply ignores the historic 'boom-

See **TRADE** page 76

■ Developing and bringing a software product to market involves tremendous human and financial resources. A series beginning this week examines legal steps to protect such investments/**72**

■ Sorbus, the Bell Atlantic third-party maintenance subsidiary, recently attracted an IBM service executive as its new president/**73**

■ Sperry recently named its first national distributor for selling micro products to valued-added resellers/**75**

Cunningham upbeat after first month at CCI

By Charles Babcock
CW New York Bureau

NEW YORK — Claiming to "have worked harder and more productively than I have in a long time," former Wang Laboratories, Inc. President John F. Cunningham said he has been able within one month to set Computer Consoles, Inc. (CCI) on a new course.

Much of his time has been spent traveling between the Rochester, N.Y., Irvine, Calif., and Reston, Va., operations of the small office automation company. He became chairman and largest shareholder of the firm July 22. Cunningham said he has met most of the company's 1,500 employees individually and sat down with them in groups of 45 to discuss the company's future.

He left Wang, where he was a respected marketing force in a $2 billion company, to assume the top job in a company with revenue of $131 million last year. Cunningham said he likes the small company environment. "If it's broken, you can fix it yourself," he said at a press conference here recently.

Computer Consoles is not broken, but it has been limping through 1985. In the first six months of the year, it lost $10.1 million on revenue of $61 million after earning $6.3 million in 1984.

Cunningham said that when he decided to leave Wang, he had looked for a small company with good technology and the potential for rapid growth but one that needed his marketing skills. After 30 days at Computer Consoles, he said, he realized he had found just what he wanted, "and more."

Like Wang, Computer Consoles has been forced to lay off employees and cut costs since the start of the year. Asked how he would cut costs, Cunningham said most of the savings still to be achieved could be found in discretionary expenses, such as travel and entertainment.

Cunningham was introduced by Herman A. Affel Jr., the man who Cunningham replaced as chairman of Computer Consoles and who is now vice-chairman. Affel said the company had been looking for a strong chief operating officer for several years and thought it had found one in its former president, Vaemond H. Crane. Crane resigned after 18 months, however, to become the chairman of a California start-up company, MIPS.

Affel, 65, said he was happy to step aside for Cunningham and that the board of directors had quickly reached agreement with him on his new post. Cunningham had initiated the discussion by contacting a Computer Consoles board member, he said.

See **CHAIRMAN** page 76

IBM software pact raises questions

INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

One key ingredient was missing from the vague announcement that IBM and Microsoft Corp. had signed a development agreement for work on future operating systems and systems software products — why?

Without access to the actual fine print of the agreement [CW, Aug 26], it is hard to know exactly what is intended and why it was announced. But it would seem that IBM has done little more than formalize an already tightly knit working relationship with the Bellevue, Wash.-based microcomputer software company.

Many in the industry seem to have accepted the agreement as an ironclad declaration that the Blue Behemoth has absolutely no intention of turning its back on Microsoft's MS-DOS operating system standard. That seems like a fair interpretation; but, realistically, for IBM to desert abruptly the standard that has gained it preeminence in the world of micro hardware would have made no sense.

With a lock on the hardware arena that no antitrust whiz kid could ever bust, why on earth should IBM risk the possibility of making it easier for the spawning of an alternative standard. If IBM turned a cold shoulder to third-party applications software vendors, they would have no choice but to adopt and nurture another vendor such as the newly cooperative Apple Computer, Inc.

If we take, for the sake of argument, the view that anything IBM does is to gain a competitive advantage, perhaps analysts and vendors of IBM-compatible systems should not be breathing so easy.

■

If anyone doubted that Wang Laboratories, Inc.'s problems run deep, John Cunningham's recent remarks [see story above] should pro-

See **WANG** page 75

Apple plant sold to Alps Electric

GARDEN GROVE, Calif. — As part of its move to cut costs by transferring production to third-party manufacturers, Apple Computer, Inc. last week sold its component plant here to supplier Alps Electric USA, Inc., a subsidiary of Japan's Alps Electric Co. Terms of the sale were not disclosed.

Alps will continue to make keyboards and mouse input devices for the Macintosh, Apple IIe and IIc microcomputers at the plant. Until the sale, Apple employees manufactured those products. Alps will also build components and peripherals for other OEMs in the computer, communications and automobile electronics industries.

The automated plant is Alps' first production facility in the U.S.

"Selling the Garden Grove operation is in keeping with our plans to concentrate our efforts on personal computers while relying on third-party vendors to supply us with components and accessories," said Delbert W. Yocam, Apple's executive vice-president of product operations.

Copyright protects software development investment

FIRST IN A SERIES

By Jerome Roberts and Michael Brownell
Special to CW‡

Successfully developing and bringing a software product to market involves a substantial investment of human and financial resources. However, the value of the investment may be greatly diminished — or lost altogether — if the proprietary interest in the software product is not adequately protected.

The protection of that proprietary interest depends upon the judicious use of a combination of legal and physical tools designed for such a purpose.

The legal tools to be explored in this series include copyright, trade secret, trademark, patent, contract and semiconductor mask work law. This series is not intended to be exhaustive or to make the reader a legal expert in the area. Rather, it is intended to provide general information to assist the reader in recognizing where attention and a professional opinion, if applicable, may be advisable.

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The corporate owner's copyright ownership continues for 75 years. If the owner is an individual, the protection continues for the length of his life plus 50 years. In either case, the protection can be lost if the software is published without a valid copyright notice as discussed below.

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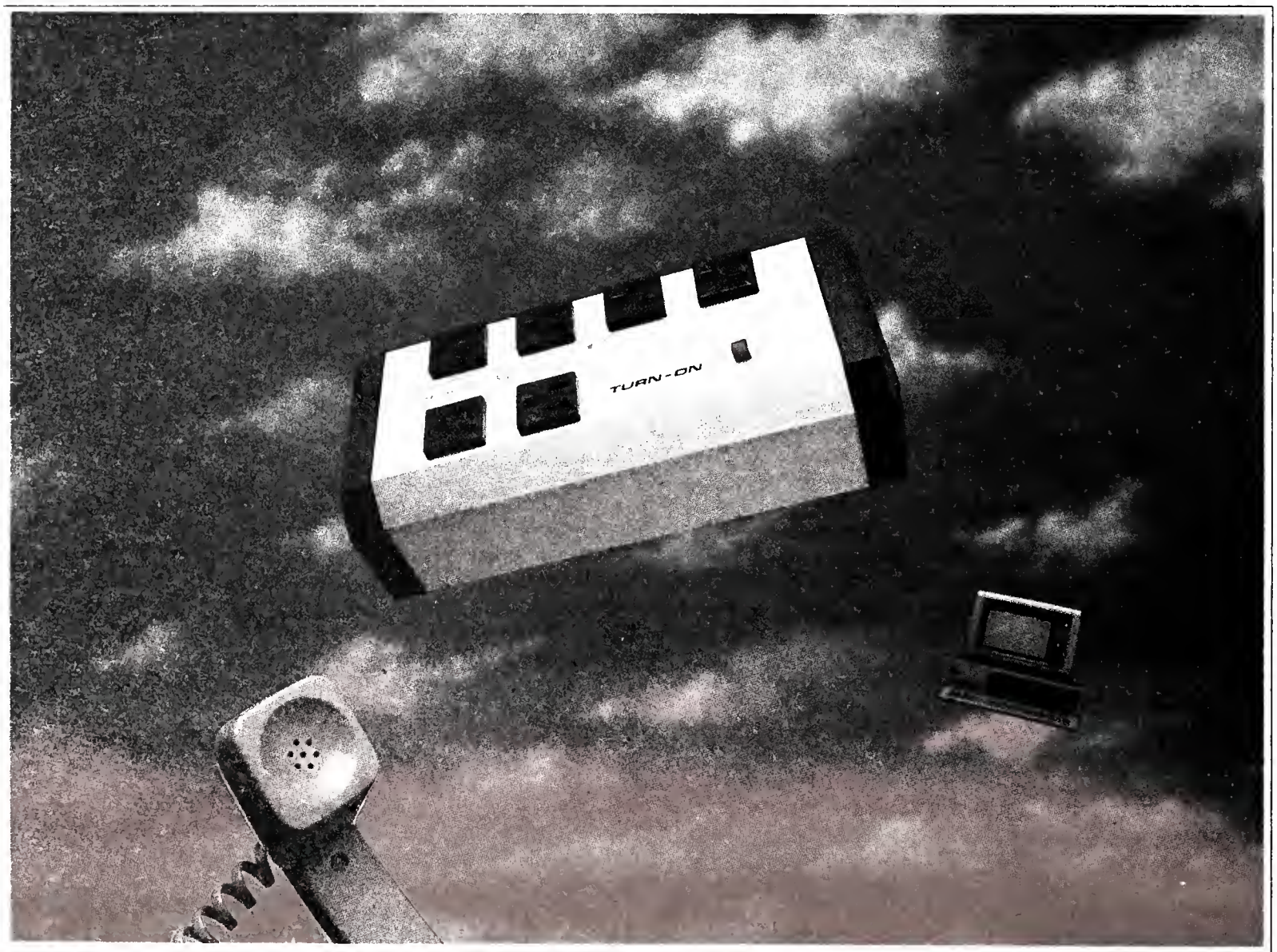
The notice should be placed on all media labels, embedded within the program code as a nonexecutable comment, placed on all documenta-

See **PROTECT** page 73

Roberts and Brownell are attorneys with the law firm of Berman, Roberts & Kelly in Chicago. This firm's practice deals with legal issues relating to procurement, development, distribution, management and protection of computer resources.



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Computervision appoints chief operating officer

BEDFORD, Mass. — Computervision Corp. recently named a member of its board of directors, Robert L. Gable, to the new position of chief operating officer and vice-chairman.

Gable, who was a vice-president and group executive at Kidde, Inc., will be responsible for all day-to-day operations, company President and Chief Executive Officer James R. Berrett said in a statement.

The financially ailing manufacturer of computer-aided manufacturing and design systems has suffered two consecutive losing quarters, following a record-breaking fiscal year in which revenue grew by 40%.

Berrett said Gable will report to him and "brings to our top management team special added strength to help us meet the complex and demanding challenges of doing business today in our industry and worldwide markets."

Gable was elected to Computervision's board of directors in 1974 and has served as chairman of the audit committee.

Prior to joining Kidde in 1966, he was president and chief executive officer of Craig Systems Corp. of Amesbury, Mass.

Former IBM exec to lead Bell Atlantic's Sorbus arm

FRAZER, Pa. — Sorbus, Inc., the third-party maintenance organization owned by a subsidiary of Bell Atlantic Corp., recently named as its president a 30-year veteran of IBM's field engineering and customer service operations.

Louis J. Ross, former director of quality and organization for the combined field engineering and customer service division of IBM, was named to replace Ronald A. Wallace, who retired.

Sorbus is a subsidiary of Bell Atlantic Enterprises and was acquired last year from Management Assistance, Inc.

Ross joined IBM as a customer engineer in 1957 after service with the U.S. Marine Corps. He held a number of positions in personnel, operations and measurements and field engineering before being assigned international responsibilities in 1967.

In 1980, Ross was appointed director of IBM's quality/field engineering division in the U.S. He was elevated to his most recent post two years later.

The retiring Wallace was affiliated with Sorbus for 17 years and served as president since 1981.

ADP announces record earnings

ROSELAND, N.J. — Automatic Data Processing, Inc. (ADP) recently announced record revenue and profits for the fourth quarter ended June 30 and its first billion-dollar year ever.

The computing services firm said revenue for the quarter was $266.3 million, up 14% from $233.1 million in the fourth quarter a year earlier.

Profits for the quarter just ended were $26.2 million, or 73 cents per share, compared with $21.8 million, or 62 cents per share.

Revenue up 16% for year

For the year, revenue was $1.03 billion, up 16% from year-earlier revenue of $888.9 million. Profits for the year were $87.8 million, or $2.47 per share, up 17% from $75.1 million, or $2.14 per share the previous year.

Josh S. Weston, president and chief executive officer, announced the results in a statement noting it was the company's 36th consecutive year of record revenue and profits. He said that the current fiscal year is expected to be as good. "Earnings per share are projected to grow by close to 20%, and revenue growth should be close to 15%," he said.

PROTECT from page 72

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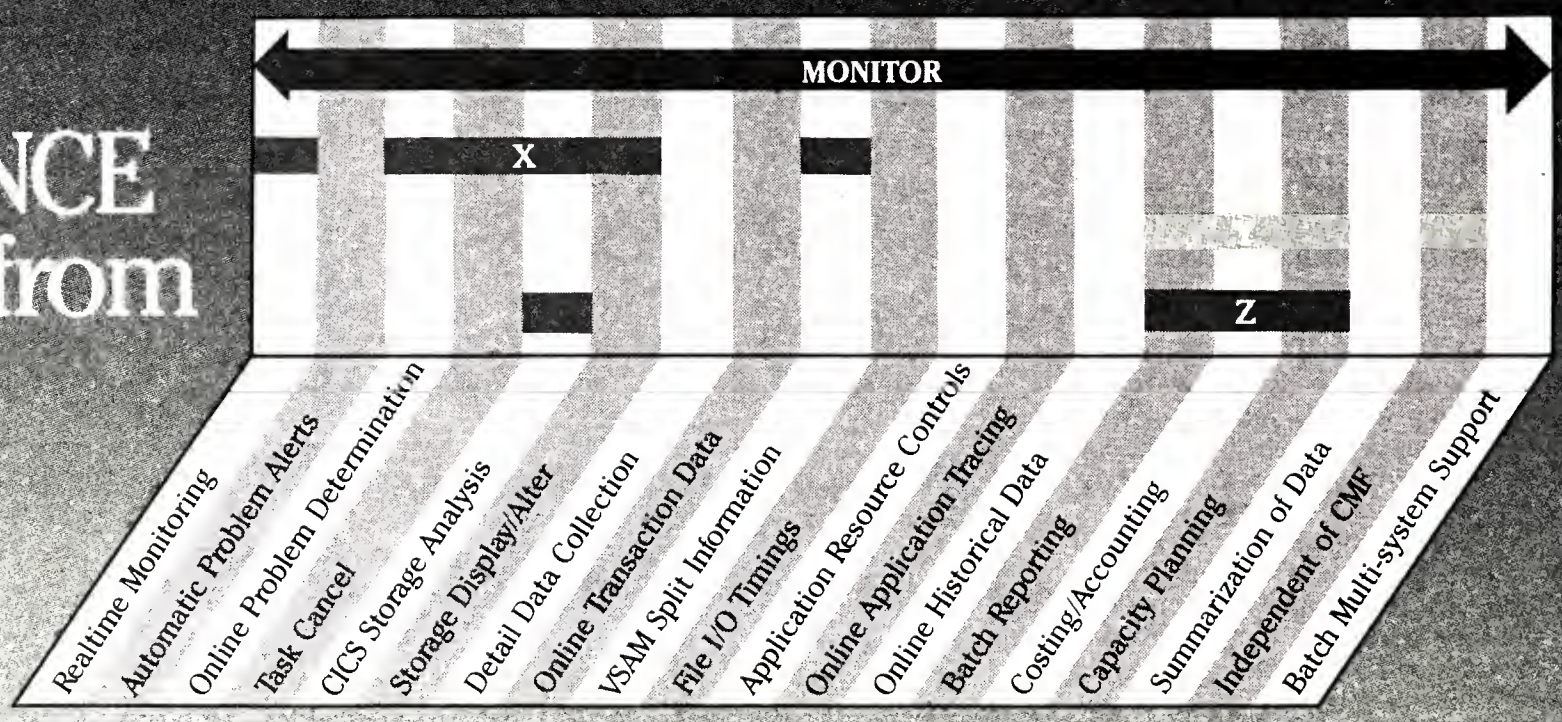

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Quadrex named Sperry reseller

BLUE BELL, Pa. — Sperry Corp. recently announced that it had signed on its first national distributor to resell Sperry's computer products to value-added resellers.

Quadrex Computer Systems, Inc., a Campbell, Calif.-based subsidiary of Quadrex Corp., was signed on to resell a line of Sperry products — including microcomputers, peripherals, software and minis — based on AT&T's Unix operating system.

The agreement represents Sperry's growing commitment to indirect sales channels, according to Rich Lucia, director of Indirect Sales Marketing for Sperry.

5¢ 10¢ NICKELS AND DIMES

Computer & Communications Technology Corp. announced revenue for its second-quarter period of $25.4 million, compared with $29.6 million for the same quarter of the previous year. Profits were $177,000, or 2 cents per share, compared with $2.9 million, or 37 cents per share, for the same period one year earlier.

■

Integrated Software Systems Corp. announced revenue for the second quarter ended June 30 of $8.7 million, an increase of 24% from $7 million in the same quarter last year. Profits were $613,000, or 11 cents per share, up 22% from $472,000, or 9 cents per share, for the same period one year earlier.

■

Wyse Technology announced that revenue for the first quarter of fiscal 1986 ended June 30 was $29.4 million, an increase of approximately 124% over $13.1 million in the same period last year. Profits were $2.5 million, or 29 cents per share, compared with $1.4 million, or 25 cents per share, in the comparable period last year.

■

Scientific Micro Systems, Inc. announced that revenue for the quarter ended June 30 was $8.5 million, compared with $11.3 million in the same quarter one year ago. The firm posted a net loss of $740,000, or 10 cents per share, compared with a profit of $1.2 million, or 21 cents per share, in the same quarter one year ago.

■

Daisy Systems Corp. announced that revenue for the third fiscal quarter ended June 30 was $32.5 million, an increase of 75% over $18.5 million for the comparable period last year. Profits for the quarter were $5.5 million, or 31 cents per share, compared with $2.8 million, or 19 cents per share, in the same quarter last year.

■

Micom Systems, Inc. reported revenue of $6.4 million for the first period of fiscal 1986, compared with $45.2 million in the corresponding period last year. Profits were $2.4 million, or 14 cents per share, compared with $6.5 million, or 38 cents per share, for the prior year's first quarter.

WANG from page 71

vide some enlightenment. In his first public appearance after departing the post of president and chief operating officer of Wang to take the top spot at Computer Consoles, Inc., Cunningham said he had never heard of his new company until earlier this year and believed Wang's chairman, An Wang, was at a similar disadvantage.

Granted, Computer Consoles is a relatively small player in the office automation field. But any competitor is a potential challenger and justifies at least examination, if not recognition.

In light of the fact that Computer Consoles has sewn up some impressive international OEM deals for its office products, the ignorance at Wang indicates a lack of attention to the basics.

■

Other than affected unions, nobody seems too surprised by AT&T's decision to ax 20% of its Information Systems group work force.

But don't look for any great turnaround in that corner until AT&T manages either to bring out an impressive state-of-the-art line of computer products or until it hooks up with an experienced challenger to IBM.

The view in this corner is not to hold one's breath for either development.

■

At least one semiconductor manufacturer is seeing a continuation of the yearlong recession that has that industry on the ropes.

In a Securities and Exchange Commission filing related to an offering of convertible shares, National Semiconductor Corp. revealed that sales are off considerably in the current quarter.

From June 1 through July 28, sales were only $175.7 million, compared with $207.1 million for the comparable period in 1984.

Profits headed south, with a loss of $44.3 million for the period, compared with profits of $2.4 million a year earlier.

Qualifying the report, National Semi said the results are not necessarily indicative of what can be expected for the quarter and do not reflect normal adjustments made at the end of each quarter.

But if a pickup in orders does not occur, significant losses are expected for the quarter, according to the company.

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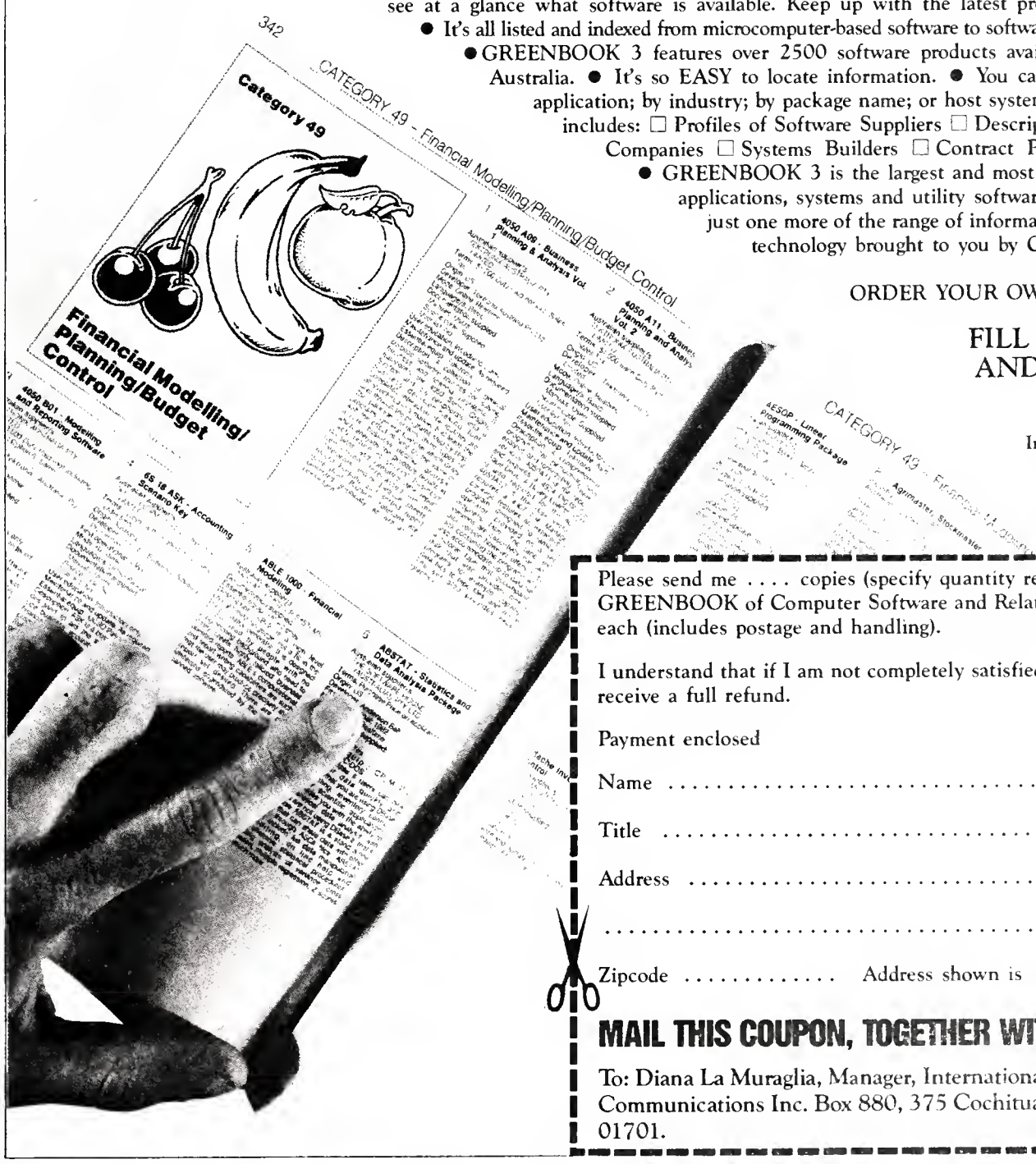

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FRA

CHAIRMAN from page 71

"An Wang [chairman of Wang] was going to have his son run the company; that's no secret. So John looked around for where he could be the real boss," Affel said.

Cunningham said he had not heard of Computer Consoles until last February, and in discussing his move with Chairman Wang, he realized in July that Wang had never heard of it.

The two companies compete at least indirectly. Both sell office automation systems to small- and medium-size businesses, including legal offices. Computer Consoles sold a major system in Wang's backyard last year when it provided the office automation system to Hale & Dorr, Boston's largest law firm.

Computer Consoles is more of a vertical market manufacturer, however, incorporating special software packages on its Power series of AT&T Unix-based processors.

Cunningham is still a member of the board of directors at Wang. Attorneys at Wang are examining the relationship, and Cunningham said he would probably submit his resignation at an October board meeting.

Cunningham disclosed that he had decided to move Computer Console's headquarters, which have been in Rochester since it was founded in 1968, to Boston. A small planning and administrative staff will work with him there.

Cunningham said he will push Computer Consoles to introduce more low-end products, since its Power 6/32 Unix processor represents too much overhead for a small business. New low-end products will be announced before the start of the Sept. 18 conference on Unix in New York, he said.

Computer Consoles' core business has been selling hardware and software to specialized users such as law offices and financial service firms. Its hopes of selling to larger customers with broader needs would be based on the assumption that these customers would have the in-house technical skills to develop their own applications, Cunningham said.

He said Computer Consoles has overlooked the possibility to date of major sales to OEMs and value-added resellers, and he expects to reorient efforts in that direction over the next few months.

While he anticipates operating in the black in 1986, he said Computer Consoles could not expect to resume its rapid growth path before 18 to 24 months.

TRADE from page 71

and-bust' cycles of the semiconductor industry," Matsumura said. "The current slump in the U.S. industry is primarily due to depressed markets for personal computers and video games, as well as the current misalignment in exchange rates."

The EIAJ, an association of 600 Japanese business and consumer electronics manufacturers, claimed that U.S. chip makers hold a 19.1% share of the Japanese market, compared with the Japanese share of 9.6% of the U.S. market. Matsumura charged that SIA statistics showing the opposite imbalance fail to include Japanese sales of chips made by U.S. companies in off-shore plants.

The EIAJ further charged that SIA figures have downplayed U.S. vendors' share of the U.S. market by ignoring sales of chips within so-called captive manufacturers, such as AT&T and IBM.

An EIAJ spokesman claimed that such sales by U.S. companies to themselves account for approximately 32% of domestic semiconductor sales. "The SIA's failure to include those sales accounts for the large disparity between their figures and ours," the spokesman said.

Figures inaccurate, irrelevant

For its part, the SIA accused the EIAJ of juggling numbers from "a variety of nontraditional sources" to discredit the SIA complaint. "Not only are their statistics misleading and inaccurate, they are also irrelevant," according to Daryl Hatano, manager of governmental affairs for San Jose, Calif.-based SIA.

"Our goal is a share of the Japanese market comparable to our worldwide share. If they inflate our Japanese share by using those methods, our worldwide share is inflated by the same amount."

Hatano said the SIA market share figures are based on figures from what he called two "universally accepted sources" — the World Semiconductor Trade Statistics program and the U.S.-Japan High-Technology Working Group.

LSI, Kawasaki Steel to build chip facility

MILPITAS, Calif. — LSI Logic Corp., a semiconductor vendor based here, recently announced a joint venture with a $5 billion Japanese steel company to produce silicon wafers and application-specific, very large-scale integration chips in Japan.

LSI and Kawasaki Steel Corp. announced the formation of Tokyo-based Nihon Semiconductor Corp. to build a $100 million chip manufacturing facility at a site that remains to be announced. The plant is expected to be completed by mid-1987 and employ 250 people by the end of 1988.

LSI currently has another Tokyo-based affiliate, Nihon LSI Logic Corp., to market its Cmos chips in the Far East.

Nihon LSI President Keiske K. Yawata was named president of Nihon Semiconductor.

In automating an office, one must often choose between piece and harmony.

Most companies approach office automation piecemeal. So it's not surprising when their wordprocessors can't talk to their microcomputers. And mainframe text editing is frequently inaccessible to the personnel who need it most. It's also why Boeing Computer Services now introduces Boeing Office Solutions.

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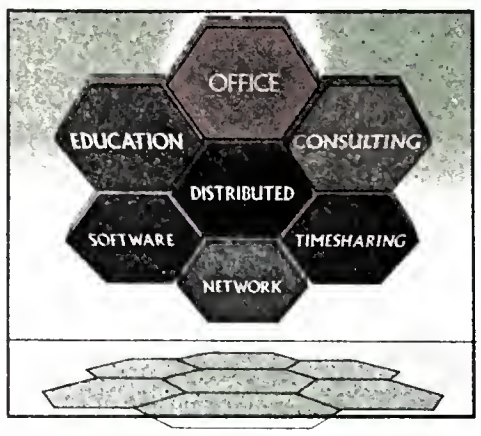

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Boeing Office Solutions are just one part of Boeing's complete integrated information services. Including enhanced remote computing services. Distributed processing and micro/mainframe links. Additional software solutions. Education and training. And a variety of professional support services.

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Fresno County is located centrally between Los Angeles and San Francisco at the base of the Sierra Nevadas. The City of Fresno is the County seat and has a metropolitan population of more than 387,000.

If interested, send us a resume clearly indicating your technical background, managerial experience, and salary history. Resumes and inquiries should be directed to:

Lisa Patterson or Dennis Marshall
Fresno County Personnel
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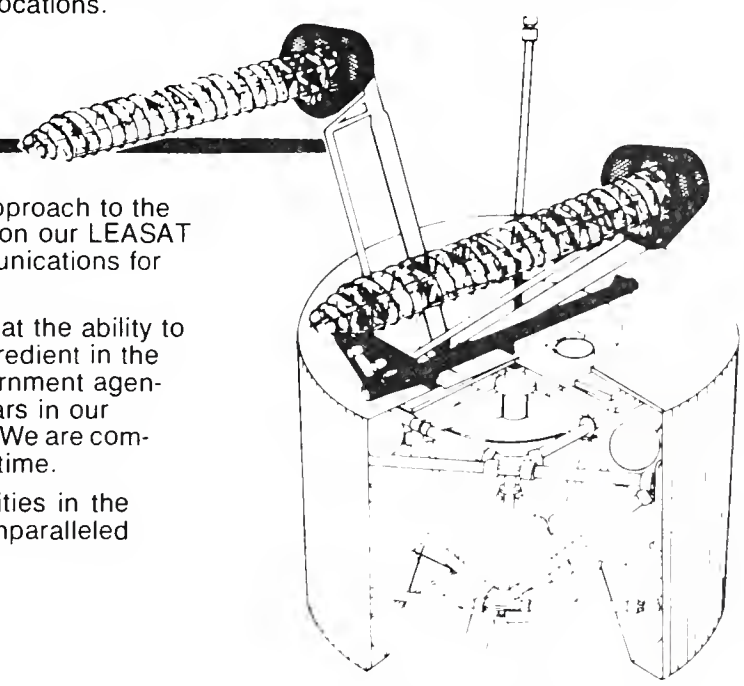

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(206) 455-6096

Application must arrive before 4:30 p.m., Thursday, September 12, 1985.

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Send your resume, not later than September 30, 1985, in confidence to:

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Experience with SPIRES (Stanford Public Information Retrieval System), Cobol, PL/1, PASCAL, C, and familiarity with OS/VS, CMS, MVS, MTS, UNIX, IMS, DL/1 and consulting experience are highly desirable. Expertise in Fortran or Assembler, and strong interpersonal skills are mandatory.

A Bachelors degree is required and an advanced degree and teaching experience are highly desirable.

Statistical Computing Consultant: assists and advises students, faculty, staff, and external users in selecting and using software and interpreting results in statistical applications. The schools of Engineering, Science, Management, and Humanities and the Social Sciences represent the largest client base. The consultant will also teach short courses on the use of applications software. Other responsibilities include the surveying, installation, and documentation of new applications software for both the IBM 3081D mainframe and microcomputers, as well as the maintenance of existing software on the system. Opportunities for participation in university research projects may be available.

At least an M.S. in statistics (or related field) is required and a Ph.D. is desirable. University teaching experience and strengths in other areas of computational mathematics (numerical analysis, operations research) are highly desirable. A thorough knowledge of several statistical packages (e.g., SAS, SPSSx, BMDP) and Fortran is important. Adaptability and an interest in learning new techniques and package is essential.

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For immediate and confidential consideration, send your resume with salary history to: **Floating Point Systems, Inc., Attn: Bob Clay, P.O. Box 23489 CW-22, Portland, OR 97223.** For questions call **1-800-547-5627.**

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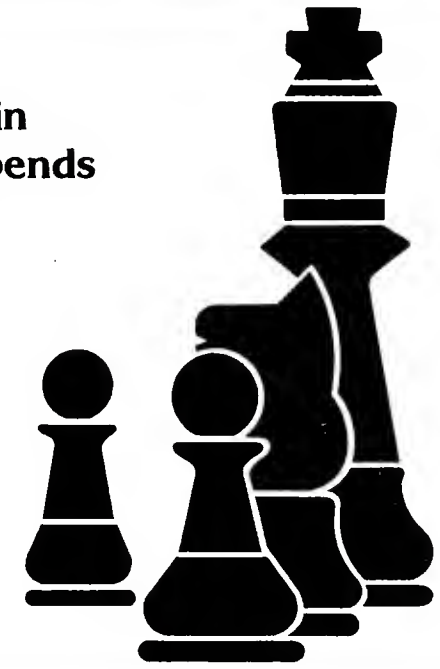

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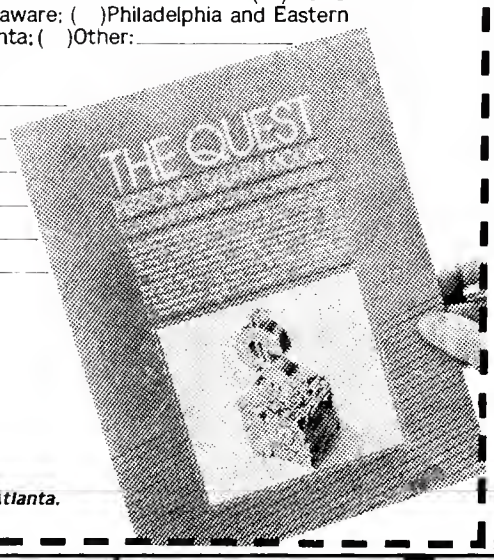

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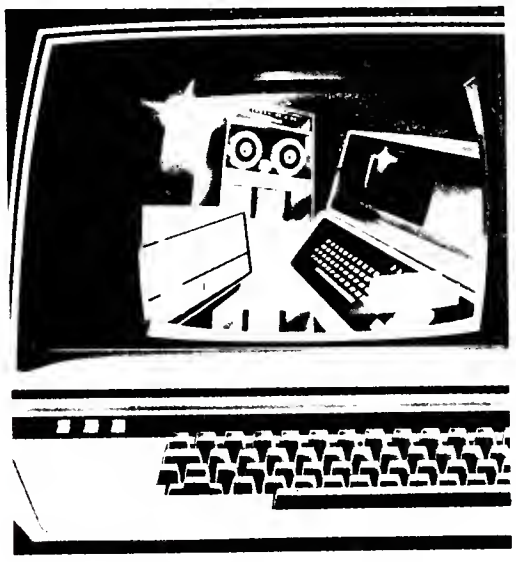

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4331-1	0 25	0 5 to 1	3083E	4 2	8 to 32
4331-11	0 38	1 to 2	3033N	4 3	4 to 16
4331-2	0 50	1 to 4	3083EX	4 4	8 to 32
4341-9	0 52	1 to 4	3033UP	5.0	4 to 24
4361-3	0 70	2 to 4	3083B	6 3	8 to 32
4341-10	0 75	2 to 4	3083BX	6 6	8 to 32
4341-1	0 88	2 to 4	3083J	8 4	8 to 32
4341-11	1 1	2 to 8	3033MP	8 5	8 to 32
4361-4	1 15	2 to 12	3033AP	8.5	4 to 24
3031	1.2	2 to 8	3083JX	8.8	8 to 32
4361-5	1 45	2 to 12	3081D	10 0	16 to 32
4341-2	1 5	2 to 16	3081G	11 0	16 to 48
4341-12	1 65	2 to 16	3081GX	11 9	16 to 64
3031AP	2.0	2 to 8	3081K	14 0	16 to 48
4381-1	2.1	4 to 16	3081KX	15 5	16 to 64
3032	2 5	2 to 8	3084G	26 6	32 to 96
4381-2	2 7	4 to 32	3084QX	28 7	32 to 128
3033S	2 9	4 to 16	•3090-200	29 4	64 to 192
•3083CX	3.3	8 to 32	†3090-400	52 9	128 to 384

•First Installation 1984 †First installation 1987

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470V 8	6.5	8 to 32
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5850	11.6	16 to 64
5860	14 0	16 to 64
5867	22.0	24 to 64
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AS 9050	9	8 to 48
AS 9060	11 2	16 to 64
AS 9070	16 2	16 to 64
AS 9080	20	16 to 64
†AS XL-60	28	32 to 256
†AS XL-80	50	64 to 256

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The above information is intended as a guideline for computer users on relative computer system instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware software configurations, and system manufacturers continually modify computer models as design improvements in hardware and software arise

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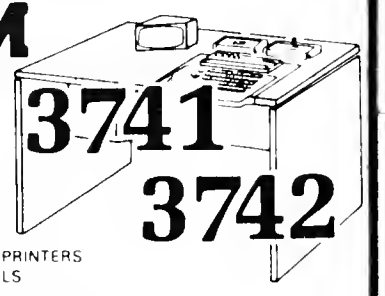

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Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Basic Four, Burroughs, Control Data, Disk Drives and Tapes, Amdahl, Prime, Modems, Perkin Elmer, Printers, TI, Tapes, Wang, Qantel, Desk Top Computers, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be cleanly typewritten. Ads must be given over the phone to our team of ad takers, or sent in writing, no camera ready material will be accepted. The standard size is 1 column by 1 inch deep. These units may be combined to form larger size ads. No borders or logos are allowed. You may not have several different types of equipment listed, i.e. DEC, Honeywell, IBM.

Cost: The price for each standard unit is $140.00 (One unit minimum and no fractional units allowed.) There are no agency commisions or quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Ad size desired: _____

Issue Date(s): _____

Classification: _____

Name: _____

Company: _____

Address: _____

Telephone: _____

Send this form to:
COMPUTERWORLD
CLASSIFIED ADVERTISING
375 Cochituate Road, Box 880
Framingham, MA 01701

1-800-343-6474 **617-879-0700**

The Bulletin Board

Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease

BASIC FOUR | WANG | BURROUGHS | PRINTERS

CONTROL DATA | QANTEL | TERMINALS

HEWLETT PACKARD

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SYSTEMS & PERIPHERALS
BUYERS WORLDWIDE
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COMPANY NAME
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computer product needs
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0000000000
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(555)555-5555
11111

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• SERVICE •
Authorized & Certified
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NCR

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NCR Maint. Avail. Immed
YOUR COMPANY NAME
00000000000
0000000000
(555)555-5555
Loan Any Other Company
Except NCR!

FOR SALE OR LEASE
BY OWNER
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With 4 Meg Main Memory
(10) 6580 Disk Drives w Cntrl
(1) 647-2000 LPM Line Printer
(1) 646-1200 LPM Line Printer
(1) 6420-600 LPM Line Printer
(2) 621 Communication Multiplexors
(2) 634 Magnetic Tape Units
(1) 6780 Check Sorter - 24 Pockets
(1) 721 Comm. Front End Processor
(38) 7900 CRT Terminals
(16) 2261 Financial Teller Terminals
(1) 7500 Key To Diskette Terminals
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80-40 UNIVAC
80-40 UNIVAC
1100/40 UNIVAC
1100/40 UNIVAC
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(555)555-5555

FOR LEASE
UNIVAC 90/30
[illegible]
YOUR COMPANY NAME
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The Bulletin Board

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How Does The Bulletin Board Work?

- The Bulletin Board is designed to advertise only one piece of equipment or software per unit.
- Units are one column wide by one inch deep at a cost of $140.00 per column inch. Although several units may be purchased for one advertisement, there will be no quantity discount.
- All ads are standard in format and typeface. No special typeface, borders or logos are allowed. Copy may be up to 25 words per unit.
- The Bulletin Board ads are listed by manufacturer or by product type under appropriate headlines.
- Ads are set on a six-column page in our classified section under "The Bulletin Board".

How to Place an Ad in the Bulletin Board:

- We suggest you prepare your ad before contacting us. Here are some guidelines:
  The first line is set in larger, bold type and should contain standard equipment identification.
  The body copy should describe the equipment and state the price.
  The closing should supply the seller's name and telephone number.
  This is all the information an interested buyer needs for follow up.
- Ads are accepted by mail, phone or by telecopier.
- Deadline is 7 days in advance of Monday issue.
- If you have never advertised with **Computerworld,** we request a check with your order.
- The Bulletin Board ads are not agency commissionable nor may they be applied to contract advertisers inch count.
- We assume no liability for errors beyond the price of the ad.

Here's the Address and Phone.

The Bulletin Board
Classified Advertising
Computerworld
Box 880
Framingham, MA 01701
Toll-free (800) 343-6474
(In Mass., call 617-879-0700)

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[illegible]
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8809-2
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For Signed Orders
System/34
[illegible]
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2501 B1, 3340 A2, S 3 D26
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S/38

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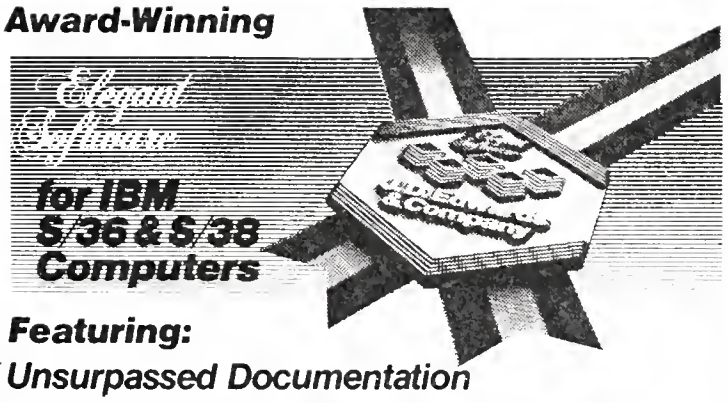

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Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Real Estate, and others).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines. Any special artwork should be enclosed with your ad also. Logos must be submitted on white bond paper for best reproduction.

Cost: Our rates are $144.90 per column inch. (Each column is 1 13/16") Minimum size is two column inches (1 13/16" wide by 2" deep) and costs $289.80 per insertion. Extra space is available in half-inch increments and costs $72.45. Box numbers are $15.00 extra per insertion.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE, or a Purchase Order Number. Any extensions on this policy must be made through our Credit Department.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

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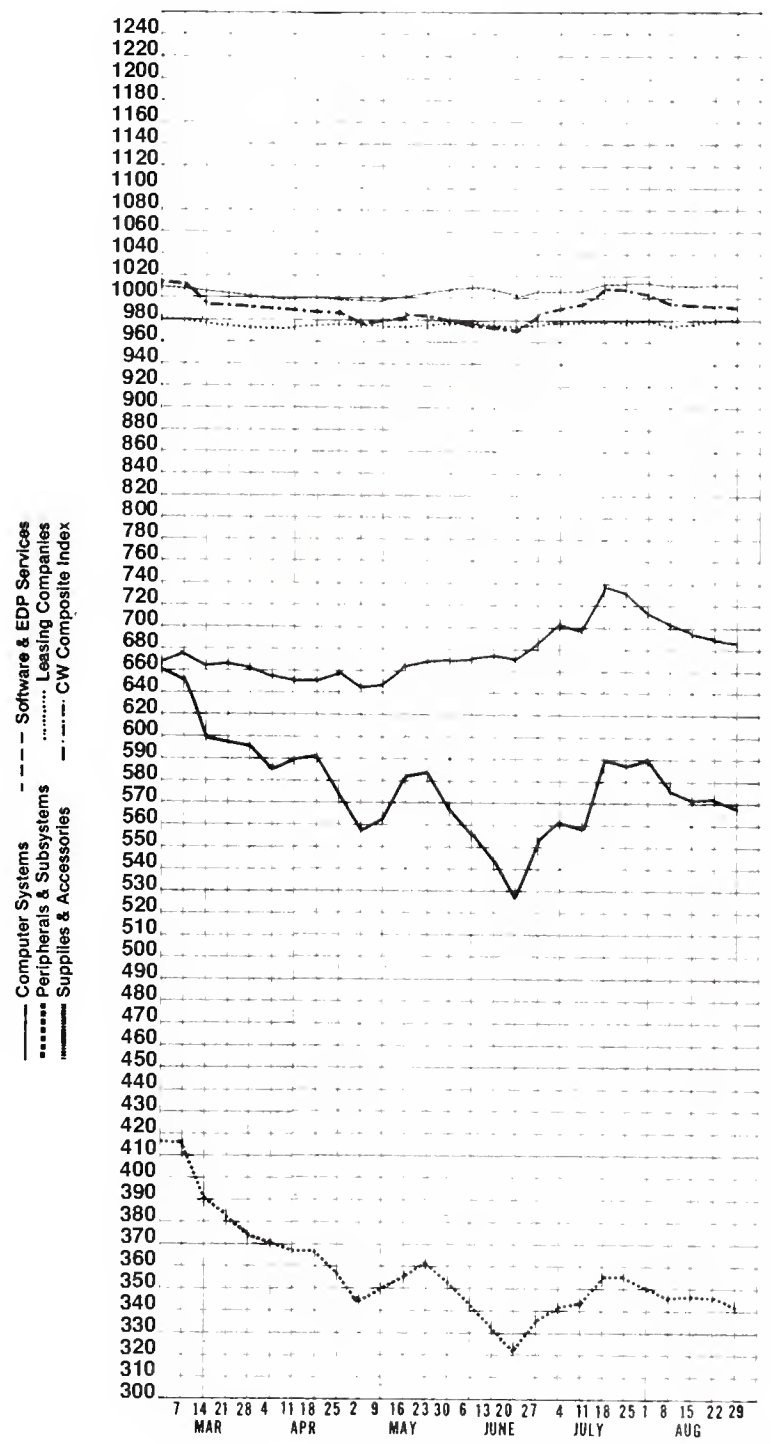
Computerworld Stock Trading Index



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E X C H		PRICE 1985 RANGE (1)	CLOSE AUG 28 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	5- 12	5 5/8	- 1/8	-2.1
O	ALTOS COMPUTER SYST	7- 14	10 1/4	- 1/4	-2.3
A	AMDAHL CORP	10- 19	13 7/8	- 1/8	-0.8
O	APPLE COMPUTER INC	14- 31	15 1/4	0	0.0
N	AT&T	18- 25	21 5/8	- 1/4	-1.1
N	BURROUGHS CORP	51- 66	65 1/4	+ 5/8	+0.9
O	COMPAG COMPUTER CP	4- 12	11 1/2	0	0.0
O	COMPUTER AUTOMATION	3- 9	7 1/8	0	0.0
A	COMPUTER CONSOLES	5- 20	7 5/8	+ 7/8	+12.9
N	CONTROL DATA CORP	23- 39	24 1/4	+1 3/8	+6.0
O	CONVERGENT TECHNOL	5- 17	8 5/8	- 3/8	-4.1
O	CPT CORP	5- 12	6 1/8	0	0.0
N	CRAY RESEARCH INC	23- 51	50 3/4	+2	+4.1
O	DAISY SYSTEMS CORP	21- 38	23 1/2	-1 1/4	-5.0
N	DATA GENERAL CORP	31- 76	38 5/8	+ 1/2	+1.3
N	DATAPOINT CORP	5- 23	5 1/8	+ 1/4	+5.1
N	DIGITAL EQUIPMENT	85-126	104 3/8	+1 5/8	+1.5
A	EECO INC	12- 16	14 7/8	0	0.0
N	ELECTRONIC ASSOC.	3- 6	4 5/8	- 1/4	-5.1
N	FLOATING POINT SYST	15- 35	34 3/4	+2 1/2	+7.7
N	FOXBORO	24- 34	25 5/8	- 3/8	-1.4
N	GOULD INC	20- 32	27 3/4	+2 3/4	+11.0
N	HARRIS CORP	25- 35	25 5/8	- 1/2	-1.9
N	HEWLETT-PACKARD CO	31- 44	36 1/2	+ 1/2	+1.3
N	HONEYWELL INC	53- 67	61 3/8	-3 1/8	-4.8
N	IBM	116-138	128	- 3/8	-0.2
O	IPL SYSTEMS INC	1- 4	1 5/8	- 3/8	-18.7
N	ITT CORP	24- 37	33 7/8	+1 3/8	+4.2
N	M/A-COM INC	16- 24	19 3/4	- 1/4	-1.3
N	MANAGEMENT ASSIST	2- 29	2 5/8	+ 1/8	+5.0
N	MATSUSHITA ELEC(ADR)	52- 66	51 1/2	-3 5/8	-6.5
N	MODULAR COMPUTER SYS	6- 10	6 7/8	0	0.0
N	MOHAWK DATA SCI	2- 15	2	+ 1/8	+6.6
N	MOTOROLA INC	29- 44	36 5/8	+ 1/4	+0.6
N	NAT'L SEMICONDUCTOR	10- 17	11 7/8	+1 3/4	-12.8
N	NBI INC	13- 21	15 7/8	- 1/8	-0.7
N	NCR	23- 36	34 1/8	- 1/8	-0.3
N	PERKIN-ELMER	22- 30	26 1/4	0	0.0
N	PRIME COMPUTER INC	15- 20	18	0	0.0
N	SPERRY CORP	35- 59	50 5/8	+1	+2.0
O	STRATUS COMPUTER INC	8- 19	17 3/4	+1 1/4	+7.5
O	TANDEM COMPUTERS INC	14- 29	14 1/8	-1 1/8	-7.3
N	TANDY CORP	24- 37	34 1/4	- 3/8	-1.0
O	TELEVIDEO SYSTEMS	2- 7	2 1/4	- 1/8	-5.2
O	TELXON CORP	7- 18	17	0	0.0
N	TEXAS INSTRUMENTS	86-149	96 3/4	0	0.0
A	ULTIMATE CORP	8- 24	13 3/8	- 1/8	-0.9
O	VECTOR GRAPHICS INC	0- 1	1/4	- 1/16	-18.3
A	WANG LABS "B"	15- 32	16 7/8	+ 1/4	+1.5
A	WANG LABS "C"	15- 32	16 3/4	- 1/8	-0.7
N	XEROX CORP	47- 56	52 3/8	- 1/8	-0.2
	LEASING COMPANIES				
N	COMDISCO INC	8- 20	19 1/8	- 1/2	-2.5
O	CONTINENTAL INFO SYS	5- 12	11 1/2	+ 3/8	+3.3
O	FINALCO GROUP INC	3- 7	5 1/8	0	0.0
O	PHOENIX AMERICAN INC	2- 8	2 1/2	+ 1/4	+11.1
O	SELECTERM INC	8- 14	7 3/4	- 1/8	-1.5
N	U.S. LEASING	33- 43	34 3/8	- 1/2	-1.4
	COMPONENTS				
N	ADVANCED MICRO DEV	23- 41	27 7/8	-1	-3.4
O	ADV'D SEMICONDUCTOR	9- 25	8 3/4	- 1/4	-2.7
N	ANALOG DEVICES INC	16- 25	22 1/4	+1 1/4	+5.9
O	ANALOGIC CORP	9- 16	14 3/8	- 1/8	-0.8
N	APPLIED MAGNETICS CP	8- 16	14	- 1/8	-0.8
O	MADCO CORP	3- 10	3 5/8	- 3/8	-9.3
O	MICRO MASK INC	6- 14	7 5/8	+ 1/4	-3.4
J	TERADYNE	20- 35	23 1/8	- 1/2	-2.1

E X C H		PRICE 1985 RANGE (1)	CLOSE AUG 28 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 4	3	0	0.0
N	ADVANCED SYSTEMS INC	9- 20	12 1/4	+ 1/4	+2.0
N	AGS COMPUTERS INC	10- 17	15 7/8	- 3/8	-2.3
O	AMERICAN SOFTWARE	7- 15	13	- 1/4	-1.8
N	ANACOMP INC	1- 4	2 7/8	- 1/8	-4.1
O	ANALYSTS INTL CORP	5- 11	9 1/4	0	0.0
N	APPLIED DATA RES	22- 40	22 7/8	- 5/8	-2.6
O	ASHTON TATE	6- 13	11 1/2	- 5/8	-5.1
O	ASK COMPUTER SYSTEMS	11- 24	13 1/2	0	0.0
B	ASTRADYNE COMP IND	1- 7	2 3/4	0	0.0
N	AUTOMATIC DATA PROC	35- 55	51 7/8	+1 1/8	+2.2
O	COMPUTER ASSOC INT'L	16- 30	26	+ 3/4	+2.9
O	COMPUTER HORIZONS	5- 11	11 1/2	+ 1/4	+2.2
O	COMPUTER NETWORK	5- 10	7 1/8	0	0.0
N	COMPUTER SCIENCES	12- 24	23 7/8	+ 3/8	+1.5
O	COMPUTER TASK GRNUP	10- 20	18	- 1/2	-2.7
O	COMPUTER USAGE	1- 3	2 1/2	- 1/4	-9.0
O	COMPUTONE SYSTEMS	4- 11	5 3/4	- 1/8	-2.1
O	COMSERV CORP	1- 6	2 7/8	0	0.0
O	COMSHARE	6- 10	9 3/8	- 1/4	-2.5
O	CULLINET SOFTWARE	17- 33	17 1/8	- 3/8	-2.1
O	CYCARE SYSTEMS INC	18- 27	20 1/4	+ 3/4	+3.8
O	DORAN SYSTEM INC	4- 15	4 1/2	- 1/8	-2.7
N	GENERAL ELECTRIC CO	53- 65	61 1/2	- 1/8	-0.2
N	GENL MOTORS E (EDS)	17- 47	39 7/8	-2 3/8	-5.6
N	GTE CORP	38- 45	40 1/4	+ 1/2	+1.2
N	INFORMATICS GENERAL	13- 27	26 7/8	0	0.0
O	INFORMATION SCIENCE	1- 6	2	+ 1/4	+14.2
O	INFOTRON SYSTEMS CP	15- 35	21 1/2	-1	-4.4
O	KEANE ASSOCIATES	9- 19	16	-1	-5.8
N	LOGICON	24- 38	33 7/8	- 3/4	-2.1
O	LOTUS DEVELOPMENT CP	17- 34	22	-3 3/4	-14.5
O	MCI COMMUNICATIONS	7- 11	9	+ 1/8	+1.4
O	MNGT SCI AMER INC	9- 16	14 5/8	+ 1/8	+0.8
O	MATHEMATICAL APP GRP	3- 9	3 1/4	- 1/8	-3.7
O	MICOM SYSTEMS INC	14- 42	19 1/4	- 1/4	-1.2
O	MICROPRO INT'L CP	2- 4	2 3/8	0	0.0
O	NATIONAL DATA CORP	7- 16	12 7/8	- 1/8	-0.9
O	ON-LINE SOFTWARE INT	4- 10	8 1/4	0	0.0
O	PANSOPHIC SYSTEMS	11- 25	24	+ 3/4	+3.2
O	PLANNING RESEARCH	9- 17	15 7/8	+ 1/8	+0.7
O	POLICY MGMT SYSTS CP	18- 35	21 3/4	+1 3/4	+8.7
O	PROGRAMMING & SYS	4- 6	5 7/8	+ 1/4	+4.4
O	REYNOLDS & REYNOLD	29- 44	39 1/4	-1 1/4	-3.0
O	SEI CORP	11- 19	18 1/4	+ 1/2	+2.8
O	SHARED MEDICAL SYST	24- 34	32 3/8	- 1/8	-0.3
O	SCIENTIFIC COMPUTERS	5- 12	6 1/8	0	0.0
O	SOFTWARE AG	11- 22	15 3/4	+ 3/4	+5.0
N	URS CORP	10- 14	11 5/8	- 1/2	-4.1
N	UCCEL	9- 17	15 3/8	- 1/8	-0.8
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	3- 9	3 7/8	+ 1/8	+3.3
A	ANERSON JACOBSON	3- 11	2 5/8	- 1/8	-4.5
O	AST RESEARCH INC	7- 23	15 3/4	- 3/4	-4.5
O	AUTO-TROL TECHNOLOGY	6- 15	6 1/8	+ 1/8	+2.0
O	AVANT-GARDE COMPUTING	6- 26	8	0	0.0
O	BANCTEC INC	5- 12	9 1/2	- 1/4	-2.5
O	BEEHIVE INT'L	1- 2	1/8	0	0.0
N	BOLT,BARANEK & NEW	19- 30	30 1/4	+1 3/4	+6.1
O	CAMBEX CORP	1- 3	7/8	- 1/8	-12.5
N	CENTRONICS DATA COOP	3- 12	4 5/8	+ 1/2	+12.1
A	CETEC CORP	6- 10	7	- 1/8	-1.7
A	COGNITRONICS	4- 7	5	- 1/4	-4.7

E X C H		PRICE 1985 RANGE (1)	CLOSE AUG 28 1985	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMPUGRAPHIC CORP	26- 37	25 7/8	- 5/8	-2.3
O	COMPUTER TRANSCEIVER	1- 4	5/8	0	0.0
N	COMPUTERVISION CORP	12- 46	14 1/8	- 3/8	-2.5
N	CONRAC CORP	13- 16	13 7/8	+ 1/4	+1.8
A	DATAPRODUCTS CORP	11- 24	12 3/4	+ 1/8	+0.9
A	DATARAM CORP	3- 7	5 5/8	0	0.0
O	DATA SWITCH CORP	4- 9	5 5/8	+ 3/8	+7.1
O	DATUM INC	5- 9	5 1/2	- 1/8	-2.2
O	DECISION DATA COMPUT	9- 19	10 5/8	+ 1/8	+1.1
O	DOCUTEL-OLIVETTI	3- 8	5 3/8	0	0.0
O	ENDATA, INC	4- 25	3 1/2	- 3/8	-9.6
O	EVANS & SUTHERLAND	6- 19	19 3/8	+1 1/2	+8.3
O	GANDALF TECHNOLOGIES	6- 20	6	- 1/8	-2.0
N	GEN'L DATA COMM IND	13- 35	12 1/2	- 1/2	-3.8
N	HAZELTINE CORP	3- 28	27 3/4	- 3/8	-1.3
O	ICOT CORP	7- 17	9	+ 3/8	+5.6
O	INFORMATION INTL INC	4- 15	14	- 1/2	-3.4
O	INTECOM INC	6- 38	5 7/8	0	0.0
O	INTEL CORP	7- 26	25 7/8	- 3/8	1.4
A	LUNDY ELECTRONICS	4- 14	13 3/4	0	0.0
O	MEGADATA CORP	4- 13	4 3/8	- 1/4	-5.4
A	MSI DATA CORP	8- 30	9 1/4	+1 1/4	+15.6
N	NASHUA CORP	15- 27	26 3/8	+ 1/8	+0.4
O	NETWORK SYSTEMS CORP	24- 45	23 7/8	- 1/2	-2.0
N	NO AMERICAN PHILIPS	30- 42	34 1/2	- 5/8	-1.7
N	NORTHERN TELECOM TD	1- 38	36 5/8	-1	-2.6
O	OMEX	1- 3	3/8	0	0.0
N	PARADYNE CORP	6- 14	10 1/4	+ 1/8	+1.2
A	PENRIL CORP	9- 29	8 3/4	- 1/4	-2.7
N	PLESSEY CO (ADR)	9- 23	21 1/2	- 3/4	-3.3
O	PRINTRONIX INC	8- 17	12	- 3/8	-3.0
O	QMS INC	3- 11	10 5/8	- 1/8	-1.1
O	RAMTEK CORP	4- 17	3 3/4	- 1/4	-6.2
N	RECOGNITION EQUIP	9- 51	9 1/4	- 1/2	-5.1
N	SANDERS ASSOCIATES	11- 36	35 1/2	- 7/8	-2.4
O	SCAN-TRON CORP	8- 16	16	+ 1/4	+1.5
N	SCIENTIFIC ATLANTA	4- 14	13 7/8	- 1/2	-3.4
O	SEAGATE TECHNOLOGY	2- 12	7 1/4	0	0.0
N	STORAGE TECHNOLOGY	1- 3	2 1/4	0	0.0
O	SYKES DATATRONICS	0- 11	1/4	- 1/16	-16.5
A	T BAR INC	5- 20	6 1/8	+1 1/8	+22.5
A	TAB PRODUCTS CO	4- 19	18 1/4	- 5/8	-3.3
O	TANDON CORP	4- 13	4 1/4	- 3/8	-8.1
A	TEC INC	8- 68	8 5/8	+ 1/4	+2.9
N	TEKTRONIX INC	30- 63	55	-8	-12.8
N	TELEX	1- 42	42 1/4	+ 3/4	+1.8
O	TESDATA SYSTEMS CP	1- 23	1	+ 1/4	-20.0
N	TIMEPLEX INC	5- 20	19 1/2	- 1/2	-2.5
N	TITAN CORP	3- 9	7	- 1/8	-1.7
O	VISUAL TECHNOLOGY	1- 10	1 3/8	- 1/8	-8.3
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	21- 29	26 1/8	- 1/4	-0.9
N	BARRY WRIGHT	18- 33	20 3/4	- 1/2	-2.4
A	DUPLEX PRODUCTS INC	12- 19	19 5/8	+ 3/8	+1.9
N	ENNIS BUS. FORMS	10- 20	18 7/8	+ 1/8	+0.7
N	3M COMPANY	74- 86	76 1/8	- 7/8	-1.1
N	MOORE CORP LTD	13- 22	18 1/4	- 3/8	-2.0
O	STANDARD REGISTER	19- 39	31	+ 1/2	+1.6
N	WALLACE COMP SERVICE	28- 46	33 7/8	-1 3/8	-5.9

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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